

AMERICAN



Class AG 3

Book A 45

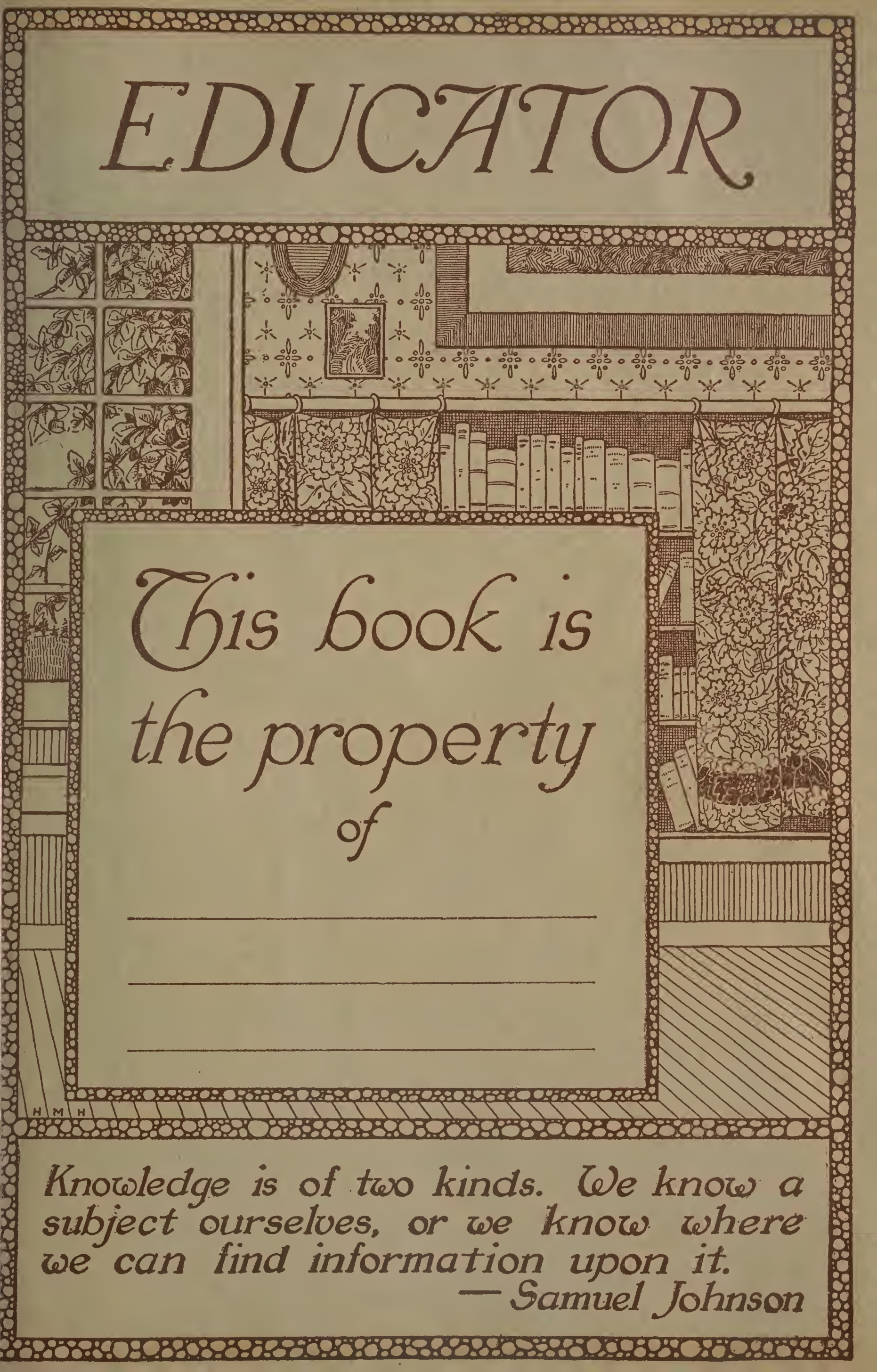
Copyright N^o 1964

COPYRIGHT DEPOSIT

*Education commences at the mother's knee,
and every word spoken within the hear-
ing of little children tends towards the
formation of character.*

—Ballou

EDUCATOR



*This book is
the property
of*

*Knowledge is of two kinds. We know a
subject ourselves, or we know where
we can find information upon it.*
— Samuel Johnson

THE AMERICAN EDUCATOR

*A New and Thoroughly Modern Reference Work Designed
to Meet the Needs of Every Age*

ELLSWORTH D. FOSTER, LL. B.

EDITOR IN CHIEF

*Associate Editor New Practical Reference Library; Author Cyclopedia
of Civil Government*

JAMES LAUGHLIN HUGHES

EDITOR FOR CANADA

Author, and Former Chief Inspector of Schools, Toronto

Extension Edition

IN EIGHT VOLUMES

1924

RALPH DURHAM COMPANY
CHICAGO PUBLISHERS

AG 5
A45
1924

© C1 A 807562

Copyright, 1923
HANSON-BELLOWS PUBLISHING COMPANY
Printed in U. S. A.

OCT 16 '24

no 1

VOLUME EIGHT

THOR, in Scandinavian mythology, son of Odin, and the god of thunder. He was the most powerful among the gods. As the special patron god of peasants, Thor entertained them after their death, as Odin, his father, entertained their masters in Valhalla. Thor possessed a magic red-hot hammer, made for him by the dwarf Loki. He would sometimes ride across the sky in his brazen chariot and then the lightning would flash from his hammer; and when he would throw it the thunder would roll. Thursday was named in honor of Thor. Jove is his counterpart in Roman mythology. See JOVE; MYTHOLOGY.

THORACIC, *thor as'ik*, **DUCT**, the principal tube of the system of lacteals and lymphatics, extending upward along the spinal column to the seventh cervical vertebra, where it pours the contents which it has gathered from the intestines, the trunk, the left arm, the lower extremities and the left side of the head, into the left subclavian vein. This tube is from fifteen to eighteen inches long and one-eighth of an inch in diameter, is made up of three coats and is well supplied with valves.

THORAX. See ABDOMEN; SKELETON.

THOREAU, *tho'ro* or *tho.ro'*, HENRY DAVID (1817-1862), an American naturalist and writer, born at Boston and educated at Harvard University. For about five years after his graduation he taught school, and then for several years he occupied himself in various ways, in land surveying, carpentering and other handicrafts. He spent no more time on work than was absolutely necessary to provide food and clothing for himself, and he devoted the greater part of his time to study and the contemplation of nature. In 1845 he built for himself a hut in a wood near Walden Pond, Concord, Mass.,



HENRY DAVID
THOREAU

and there he lived for two years, gaining a remarkable knowledge of the woodland life about him. Besides contributing to the *Dial* and other periodicals, he published *A Week on the Concord and Merrimac Rivers* and *Walden, or Life in the Woods* (1854). After his death appeared *Excursions in Field and Forest*, *The Maine Woods*, *Cape Cod* and *Early Spring in Massachusetts*.

THO'RIMUM, a metallic element discovered in 1828 by Berzelius, a Swedish chemist. It is a heavy gray powder, which burns with a bright flame when heated in air. It is widely distributed, occurring in orangite, thorite, monazite and such minerals. The dioxide, called thoria, is used in making gas mantles for Welsbach burners.

THORN APPLE, a popular name for stramonium (which see).

THORNTON, SIR HENRY (1871-), one of the leading railway managers of the world. Born at Logansport, Ind., he was educated at the University of Pennsylvania. In 1914 he was superintendent of the Long Island Railroad, when he was invited to England to direct the Great Eastern Railway. He served there and in France during the war he directed the transportation of the British Army. He was knighted and achieved the rank of Brigadier General. He was later promoted to the presidency of the Canadian National Railways.

THOROUGHWORT, *thur' o wurt*. See BONESET.

THORWALDSEN, *tore'vald zen*, BERTEL (1770-1844), the greatest sculptor Denmark has produced, and one of the foremost modern representatives of classicism in sculpture. He began his art studies at the age of eleven, at Copenhagen, his birthplace. In 1800 he went to Rome for study, and there was much influenced by Canova. His first important work was *Jason with the Golden Fleece*, in 1803. Then followed *Entry of Alexander the Great into Babylon*, and the model for *Lion of Lucerne*. In Rome also he received many important commissions, and was elected president of the Accademia di San Luca. Among his more important pieces are *Memorial to Baroness Schubart*, *Cupid and Psyche*, *Morning, Night* and *The Four Seasons*. The artist

was particularly successful with ideal and mythological subjects, but was not so strong in characterization or in dramatic action.

THOTHMES, *thoth'meez*, **III**, a king of Egypt, one of the most famous of Egyptian rulers. He came to the throne about 1538 B. C., but during the early years of his reign his half sister Hatasu ruled, much against his wish. On her death Thothmes gained control of the government, and he gratified his spite by erasing her name from every monument and temple she had built.

He soon began a series of conquests without equal in Egyptian history. Palestine, Syria, a part of Mesopotamia and the region between the Euphrates and the Mediterranean were subdued by him, and an account of his deeds was inscribed on the walls of the Temple of Karnak, which he enlarged. One of the great obelisks which he erected is now in Central Park, New York; another stands on the Thames Embankment, in London.

THOUGHT, *thawt*, the mental power by which we compare ideas and classify them according to their resemblances and differences. The power of thought is the distinguishing feature between the human mind and the minds of lower animals. The first step in thinking is the formation of concepts; the second is the formation of judgments, and the third is reasoning. There is but one thought process, and the difference in these steps is one of degree only. In the formation of concepts we compare qualities in sense perceptions and classify these perceptions according to their agreement or disagreement. In the formation of judgments we compare and classify concepts, in reasoning we compare judgments, and from this comparison we form a third judgment.

The Laws of Thought. The fundamental laws of thought are the law of identity, the law of contradiction and the law of the excluded middle. The *law of identity* means that the same thing or quality is always the same thing or quality, whatever the conditions or circumstances under which it exists. However simple this law may seem, inability to apply it leads to many failures. It is because the boy cannot see that the principles of multiplication and division are the same, wherever they occur, that he has so much difficulty with his operations in common fractions and decimals, and it is because the lawyer cannot discover the un-

derlying principles of law that he loses his case. This law of identity deals with fundamental principles and rules, and in order that it may be applied in all the varying conditions of life, the principles and laws pertaining to the various branches in a course of study should be thoroughly understood.

The *law of contradiction* means that a thing cannot exist in opposite conditions at the same time. A man cannot be dead and alive at the same time. The *law of excluded middle* means that a thing must be or must not be. A coat is either black or not black; an apple is sour or not sour. Gradations in quality form many apparent exceptions to this law, but they should not be so regarded. In forming judgments one should keep the quality under consideration constantly in mind and then determine whether the object compared does or does not agree with this quality. Failure to observe this simple law often leads to indistinct ideas and loose qualifications.

Children's Thinking. While the child begins to think as soon as he begins to form concepts, the thought power develops slowly during the first few years, and he relies almost entirely upon his powers of observation and memory. To tax a child's reasoning power before he is twelve years of age is unwise, because this can be done only at the expense of the training of the powers of observation and memory, which up to this time are particularly active, and also because the overtaxing of a mental power in its immature state cripples its development in after years. Children whose reasoning powers are overtaxed at an early age seldom make good thinkers or correct reasoners. However, the thought power should not be neglected, but within his capacity the child should be encouraged to compare, judge and classify his ideas.

Related Articles. Consult the following titles for additional information:

| | |
|----------------------|------------|
| Apperception | Logic |
| Attention | Memory |
| Association of Ideas | Psychology |
| Child Study | Reason |
| Concept | Syllogism |
| Judgment | Will |

THOUSAND AND ONE NIGHTS. See ARABIAN NIGHTS.

THOUSAND ISLANDS, a group of about 1,750 islands in the Saint Lawrence River, just below its emergence from Lake Ontario; many are mere points of rock,

while others have an area of several acres and are covered with vegetation. The section of the river containing the islands is known as Thousand Island Park. The precipitous rocks and shady groves add much to the beauty of its scenery, and the climate during summer is delightful. Beautiful summer homes, many in the form of medieval castles, have been built upon privately-owned islands. Alexandria Bay, the most important town in the park, has all the attractions that make an ideal summer resort.

THRACE, a name applied at an early period among the Greeks to a region lying north of Macedonia. Besides possessing rich meadows and corn lands, the country abounded in mines, while the Thracian horses and riders rivaled those of Thessaly. Of the rivers of Thrace, the largest and most celebrated was the Hebrus (now Maritza). Abdera, the birthplace of Democritus and Protagoras; Sestos, on the Hellespont, celebrated in the story of Hero and Leander, and Byzantium, on the peninsula on which Constantinople now stands, were the places of interest. In 1920 the powers awarded Thrace to Greece.

THRASHING MACHINE, a machine used for separating grain from the straw and chaff. It is, next to the harvester, the most important agricultural machine. Without it, it would be impossible to prepare the immense crops of wheat, oats, barley and rice for use; indeed, it made great crops possible.

The essential parts of a thrashing machine are the beater, or drum, containing iron teeth projecting from its surface; the *concave*, which is a cast-iron plate, having the shape of a section of the inside of the beater, and fitted with similar teeth, so arranged that the teeth of the revolving beater mesh into them; the *straw carrier* and the *shaker*; the *blowing drums*, sometimes called rakes, which assist in separating the loosened grain from the straw, the *winnowing apparatus*, which consists of a blower and a set of screens, that have a vibratory motion and are so graduated that they separate small seeds from the grain, and the *stacker* which carries away the straw. The machine is operated by horse power or steam power. Machines for thrashing on small farms of the Eastern and Central states are usually operated by horse power, while those used on the large wheat farms of the West and Northwest are oper-

ated by steam power, usually with an engine of 12 or 15 horse-power capacity. One of these machines will thrash from 1,200 to 1,500 bushels of wheat in a day.

History. The earliest method of thrashing was by beating out the grain with a stick. Later the grain was trodden out by animals or men. Still later a so-called *sledge* was rolled over the sheaves. This was followed by the flail, consisting of two sticks fastened together at one end by thongs. Using one as a handle, the thrasher brought down the other horizontally upon the grain. The first successful thrashing machine was invented by Michael Sterling, a Scotch farmer, in 1758, but since that time Sterling's pattern has undergone many changes and improvements.

THREAD, *thred*, a slender cord, made of two or more strands, twisted together. Thread is made of cotton, linen and silk, but the manufacture of cotton thread so far exceeds that of the others in quantity and value that this is the sort of thread meant when the term is used without qualification. Cotton thread is made from the long fiber, or Sea Island, cotton (see COTTON). The process is long and somewhat complicated. The fiber is carefully picked and carded. As the cotton passes from the carding machine, it is packed into a thick, soft card, which is coiled into a can. These coils of ropes pass to the *drawing frame*, which is an arrangement for passing the ropes between a series of rollers, each succeeding set moving faster than the one before, so that the cotton is drawn out fine and thin, like a ribbon. From the drawing frame the cotton passes to the *doubling frame*, which compresses it into a very fine, delicate strip. These strips are then lapped and again drawn out; then recarded, for the purpose of removing any imperfections that may remain. From the second set of cards the threadlike roll or cord is wound upon a bobbin. Six of these are then twisted together, into a large-sized yarn, which is reduced by successive spinings until it reaches the size of a coarse cotton yarn. From this the thread is spun. Several spinings are necessary to complete the operation, since thread of the best quality must contain a number of strands, each of which is hard twisted, and all of which are thoroughly twisted together. After spinning, the thread is inspected, then bleached, if white thread is desired, or colored, and wound upon spools for the market.

THREAD WORM, a threadlike intestinal worm annoying to all higher animals, including human beings. Children are the most frequent sufferers.

THREE RIVERS, QUE., on the north bank of the Saint Lawrence River, at its confluence with the Saint Maurice, and on the Canadian Pacific and Canadian National railways, nearly one hundred miles northeast of Montreal. It is one of the oldest towns in Canada. The chief industry is manufacturing, the principal products being lumber, machinery, iron pipe, tools, boots and shoes, paper and foundry supplies. Population, 1911, 13,691; in 1921, 22,367.

THRIFT. "Society," wrote Samuel Smiles, "mainly consists of two classes—the savers and the wasters, the provident and improvident, the thrifty and thriftless, the haves and have-nots." In Christ's parable of the talents there is a graphic picture of the "haves" and the "have-nots." The former were the industrious servants who doubled the talents given them by their master. The "have-not" in the story hid his talent in the ground and was empty-handed when his master returned and asked for a reckoning. Our parable concludes with the often-quoted saying, "For unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath." These words sum up well the thrift idea.

The Length and Breadth of Thrift. The average person thinks of thrift chiefly in terms of money saving. While that is important, it is only one phase of thrift. The really thrifty person is one who saves not only money, but time and strength and effort. Thrift, moreover, means mental and moral discipline. It means exercising will power, sacrificing personal desires, overcoming temptation. Some of the various phases of thrift are discussed in the following paragraphs.

Saving and Spending. "Make all you can, save all you can, give all you can" is advice attributed to John Wesley. This is good advice because one who follows it must of necessity be industrious, saving and generous. A thrifty person is a happy medium between a spendthrift and a miser, either one of whom is an undesirable citizen. There is no one who is not benefited by acquiring the saving habit. The family of small income, the working girl, the boy starting at the bot-

tom of the ladder of industry, the business man and the capitalists alike need a surplus, whether it be money laid aside for the proverbial rainy day, money for investment or working capital.

Two brothers earning moderate salaries began married life at the same time. A married a girl who had earned her own living for several years, and who knew the value of money. The young couple decided that they would devote the portion of A's salary allotted for rent to buying a home. They found a modest house in the suburbs, made an initial payment, and arranged to pay for the home at the rate of thirty-five dollars a month. They figured that this monthly installment (which included principal and interest) plus insurance, taxes and repairs, would make their total rent about fifty dollars a month. B preferred to rent a heated flat. "When you count up your expenses and the worry and work a house brings you you aren't ahead at all," he said to his brother. But Mr. and Mrs. A were satisfied with their plan. Ten years passed by. Each brother had spent about \$600 a year for shelter, and A had endured his share of work and worry, as his brother had prophesied. B had had shelter, plus janitor service, plus heat, and was saved insurance bills and taxes. Yet at the end of ten years one brother had his home paid for, and its value had increased one-third, which offset the money he had spent in repairs and improvements. B had—exactly nothing. He had spent \$6,000 for rent, and at the end of the period he was just where he started.

Saving is most successful when it is done methodically and regularly. A working girl who was considered a good manager by her friends told one who inquired that she systematically divided her monthly salary each pay day. So much was allotted for regular expenses (which do not greatly vary from month to month), so much for pleasure, and so much for her savings account. The amount saved each month always had to reach a certain figure. When she had to buy clothes this figure was lower than at other times, but it never went below a certain minimum. This girl kept a record of all her expenditures, so that she knew exactly where her money went. After several years of business life she had saved enough to take a coveted trip to Europe, and she had still a respectable surplus in the bank.

The school savings bank movement is teaching children to save regularly and helping them to form thrifty habits. It is the testimony of the majority of young people starting out in business life that the average employer prefers to advance those who have the savings-bank habit. A business man argues that a young man who will save for himself will save for the firm, and thrifty personal habits make a good foundation for effective service.

Thrift of Time. "Dost thou love life?" asks Benjamin Franklin in his *Almanac*. "Then do not squander time, for that is the stuff that life is made of." Another noted man has observed, "If I know what a boy does in his spare time, I can tell you what kind of man he will be." Arnold Bennett, in his interesting essay on "How to Live on Twenty-four Hours a Day," replies to the familiar plea of "I haven't the time," with the pertinent retort "You have all the time there is." Furthermore, every individual has exactly the same allotment of this precious fabric of life. The wise are those who know how to use it to good advantage.

Consider what can be accomplished by the wise use of spare moments. In one year 46,225 school boys in the Southern states planted and cultivated an acre of corn each, and the work was all done in their spare time. In another year something like 24,000 boys and girls in various parts of the Union produced through spare-time labor over \$509,000 worth of food products. There are thousands of young people to-day who are earning good salaries because they previously devoted their spare time to learning something that would help them to advance. There are many others who have made no progress because they have dawdled away their spare moments.

Boys and girls should learn to make good use of every hour of the day. When they study they should concentrate, and when they play they should play with zest. Theodore Roosevelt said, "When you play, play hard, but when you work do not play at all." A disagreeable task seems twice as distasteful when one lingers over it, and putting off necessary but unpleasant duties is as useless as it is wasteful. Start the day right by getting up at the first call, and keep the day right by wasting none of its precious minutes.

A Stitch in Time. A French writer tells a story of a country family who neglected to mend the gate to the stock and poultry yard.

One day a fine pig escaped through the broken gate, and the family, including the gardener, cook and milkmaid, started in pursuit of the fugitive. The gardener was the first to overtake him, and in leaping out of a ditch to cut off the pig's escape, sprained his ankle. When the cook returned to the house she found that the linen which had been hanging before the fire was so badly scorched that it was ruined. The milkmaid, on her return to the cowshed, found that in the excitement she had forgotten to tie up the cattle, and one of the cows had escaped and had broken the leg of a colt that happened to be kept in the same shed. The sprained ankle of the gardener kept him in bed for two weeks, and the loss of his work, plus the cost of the linen, plus the damage to the colt, made a rather large total of expense. All of this resulted from the want of a latch which would have cost a few cents.

Carelessness, neglect and forgetfulness are arch foes of thrift and stumbling blocks in the path of progress. Two girls, whom we will call Amy Barker and Fanny Leslie, were graduated in the same high school class. Both were poor girls, and both had to go to work on leaving school. Their principal found them positions in a department store and a year later he visited the store manager to see how his former pupils were prospering. He found that Amy Barker was head assistant in the department of children's dresses, but that Fanny Leslie was merely a salesgirl at an unimportant notion counter. When questioned, the store manager made the following explanation:

"Miss Leslie is fully as bright as Miss Barker, and she makes a more striking appearance, but we have not been able to advance her because she is too careless about details. Miss Barker from the beginning has been very conscientious about small things. She learned all she could about the stock and remembered what she learned, so that she could always answer our customers' questions and make intelligent suggestions. Her sales slips were always made out neatly and correctly, and we never had to trace goods sent astray because of her illegible writing. We never had to fill orders over again that she attended to. Accordingly, she has been advanced steadily and is now first assistant to the manager of an important department. In a few years from now you will see her one of our buyers at a very good salary. I am sorry that Miss Leslie has not done so well. She cannot

be trusted to remember prices, or what we have in stock. She made so many mistakes in writing names and addresses that we had to put her in the notion department, where deliveries are the exception. We cannot trust her to measure goods correctly, and unless she takes herself in hand and improves she may not even keep the position she has. It is a great pity, for she has a very pleasing personality and could make an excellent sales person if she would put her mind on details."

This girl's case is typical of so many in the business world that it is too bad some one doesn't start a thrift school for the negligent. This form of thriftlessness is not, however, confined to business girls. Negligence is a widespread failing. Thousands of lives are lost every year and millions of dollars' worth of property destroyed in fires, wrecks and accidents, because somebody has been careless, or forgetful, or has made a mistake. Over 3,000,000 pieces of mail have to be destroyed in a single year by the United States Post-office Department because they have been misdirected. Street-car companies, stores and other public institutions have to maintain special departments to take care of the things that people lose.

If every careless person would set down in a notebook at the end of each day the amount of time, money and patience that had been wasted that day, because of avoidable negligence or forgetfulness, he would have an illuminating record at the end of a week. A certain teacher, distressed by the careless habits of many of her pupils, asked them to each make out a "careless list" during one week. A week later the papers were handed in and the confessions were compiled by the teacher. This is what she reported to her shamed-faced pupils:

"I find," she said, "that fifteen slate pencils, nine lead pencils, two knives, five handkerchiefs, two hair ribbons, one book and a pair of rubbers have been lost this week. This alone represents an expenditure of three or four dollars. Ten of you report that you forgot errands, messages and commissions of one sort or another and thereby put your mothers to much inconvenience. Because one boy forgot to leave an order at the grocery for sugar his mother had to buy two cakes at the bakery, for she had promised them for the church supper. A girl reports that she forgot to tell her father that Dr. Smith wished to see him and that her father lost a day's

work by her carelessness. Several of you say that you forgot to take necessary books home from school and had zero marks in recitations the next day. One boy forfeited his week's allowance because he had too many zeros. Several of the cases of tardiness are the result of starting out from home without something and having to go back. Now, my pupils, do you think that a class with such a record will do anything worth while in life, or attain success in anything? How many of you will join a 'Think first club' and clean up this dreadful record?" Every hand in the room was raised, and from that time on the pupils began to improve. That teacher helped her pupils to remember their new resolutions by writing on the blackboard an old-fashioned proverb she had learned as a school girl.

For the want of a nail the shoe was lost;
For the want of a shoe the horse was lost;
For the want of a horse the rider was lost;
For the want of a rider the battle was lost;
Because of the battle the kingdom was lost;
And all for the want of a horseshoe nail.

Health Thrift. Taking care of the health is on a par with storing up material wealth. Progressive industrial institutions now make it their business to see that their employes work under healthful conditions, for it is obvious that a larger and better output is produced by workers who feel well than by those who are physically unfit. Many city department stores endeavor to reduce absence from work to a minimum by providing gymnasium and recreation rooms for their employes. Ill health is an expense wherever it is found, and no one can afford to ignore the needs of the body.

Very often what people like to do is the opposite of what they ought to do, and the sacrifice of preference is frequently necessary for the preservation of health. A teacher who noticed that one of her bright pupils was becoming lazy, irritable and stupid, made an investigation. She discovered that his too indulgent parents gave him a generous amount of spending money, and that he had formed the habit of going to a picture show every night in the week with an older brother. They always bought candy or peanuts, and never came home before ten o'clock. One day, after school was dismissed, this teacher and the boy had a serious conversation.

"John," she said, "What would you think of a man who had worked hard to accumulate

money to buy him a house, and who put that money in a bag with a hole in it, tied the bag over the edge of a boat, and went rowing down the river?" "Why," said the boy, "anyone who would do that would be insane." "Exactly," replied his teacher. "Now tell me what you think of a boy who is throwing away his health in the same way. John, why do you come to school every day tired and sleepy?" "Why," stammered the boy, "I guess I don't go to bed early enough." "And why," continued his teacher, "did you have such a headache yesterday that you had to be dismissed early?"

The boy hung his head. "I ate too many peanuts the night before, and they weren't roasted well. Mother said I had indigestion." "I think you see what I am getting at," said the teacher. "You can't sit in a stuffy theater every night, lose needed sleep and eat indigestible food without sacrificing one of the most precious possessions you have. Wouldn't you like to regain the good spirits and enthusiasm you used to have when you were at the head of the class and never knew what a headache meant?" John considered this a minute before he answered: "I don't honestly feel as well as I used to, but I like to go to the shows and I like candy." "The trouble with you, John," said his teacher, "is that you are being a spendthrift. You are spending all your health for something not worth while. Once a week is often enough for any boy of your age to go to a picture show, and you ought to select that one with great care. You used to find pleasure in baseball and swimming, and I am sure a healthy appetite for good home cooking is more enjoyable than the pleasure you get from eating cheap candy and underdone peanuts. Promise me to buy no candy for a week, to go to bed early every night, and to stay away from the theater until the end of the week. I want you to make this a test."

John was a boy who could listen to reason, and he followed his teacher's advice conscientiously. A week later he made this report to her: "I know now I was foolish to waste all that time and money, and I am going to keep on as you told me to last week. I feel ever so much better and can get my lessons much quicker." This boy had learned the difference between being a health spendthrift and a health saver.

America's Thrift Campaign. The American people have frequently been criticized for

their lack of thrift. In 1913 Mr. Simon W. Straus organized the American Society for Thrift, for the purpose of educating the people along the line of economy, and later the National Education Association took up the movement. The ground had therefore been somewhat prepared when America entered the World War in 1917, and national thrift became an immediate and vital factor of the struggle. The government soon began an intensive thrift campaign that reached every home in the land. "Save and waste nothing" was circulated through the country by lectures, pamphlets, billboard advertising and moving pictures. Through the Liberty Loan flotations people learned to save money as never before. Day laborers, typists, bootblacks, scrubwomen, teachers, lawyers, doctors, the small salaried man and the millionaire—all joined the ranks of the bond buyers. No one knows how many people saved their first dollar when they made the initial payment on their first liberty bond. By offering thrift stamps at twenty-five cents each the government made it possible for even the small children to become savers. The response of the school children to the suggestion that they use their candy money to buy thrift stamps was surprising even to the most optimistic. Children and adults acquired the saving habit by investing in government securities, and this in itself was as important as the actual money gain, a point which is quite frequently overlooked.

The thrift campaign, however, was not confined to the urging of people to save in order to invest in government loans. A food administration department was organized, something unknown in American history, and people began to learn new methods in food economy. They were told that enough food was wasted in the average American kitchen to feed a small family, and were shown the need of conserving because of the pressing needs of the allies. Housewives became interested in butter, sugar and wheat substitutes, economy recipes came into being by the dozen, and new ways of utilizing scraps and left-overs were discovered. Some people found out that they were eating more than was either necessary or healthful, and others learned the merits of foods to which they were not accustomed. Extravagant America also learned that fuel could and must be saved, that pleasures could be curtailed and that clothes could be made over.

Teachers in the public schools have an excellent opportunity to correlate the thrift idea with the regular school subjects. The teaching of thrift is something that should be made permanent. In the lower grades the children may be given problems which bring out the idea of saving, and such phases of thrift as insurance and investment can be emphasized in connection with the arithmetic of the upper grades. In the language and English classes, thrift can be emphasized through story telling, essay work, etc. In connection with the geography lessons the importance of conserving natural resources may be brought out. Closely related to this branch is nature study work, in which gardening and elementary agriculture have a place. In the physiology lessons emphasis should be placed on the importance of keeping healthy, and instruction be given in the care of the body. The idea may also be brought out forcibly through history and biography.

THRUSH, a group of about 240 species of singing birds, native to all parts of the world. They represent the highest order of songsters. None is very large and most of them have dark plumage, frequently spotted or striped, and with light or spotted under parts. They live in the wooded countries, chiefly on the ground, and in their habits they are generally solitary, though in the winter and in the season of migration they go in loose flocks.



WILSON'S THRUSH

In the United States and Canada the best known thrush is the *robin*, whose sociability and friendliness make it welcome everywhere. The *blue bird*, with its softly whistled song, comes in early spring. The *brown thrasher* is sometimes included in the thrush family,

but incorrectly. Its song is loud, prolonged and clear. There are eight other species east of the Mississippi and the prairie provinces. Among them the *wood thrush*, or *veery*, the *hermit thrush* and *Wilson's thrush* are charming, but shy, inhabitants of the forests and shrubbery. In some localities the wood thrush is called the *wood robin*. See **ROBIN**.

THUCYDIDES, *thu sid' i deez* (about 470—about 400 B. C.), the greatest of the Greek historians, born in Attica, a member of an aristocratic family and the possessor of rich Thracian gold mines. For a time he was a prominent commander during the Peloponnesian War, but because of his failure to relieve the siege of Amphipolis, he suffered exile for about twenty years. However, he appears to have returned to Athens in 403 B. C., the year following the termination of the war.

His masterpiece, *A History of the Peloponnesian War*, consists of eight books, the last of which is believed not to have had his final revision because of its inferiority of style and abrupt ending. This monumental work covers the period from 431 to 411 B. C., twenty-one of the twenty-eight years of the war.

As a historian Thucydides was painstaking and indefatigable in collecting and sifting facts, and terse in narrating them. His style is dignified but at times obscure through its condensations. Thucydides is unsurpassed in the power of analyzing character and action, of tracing events to their causes, of appreciating the motives of individual agents and of combining in their just relations all the threads of the tangled web of history.

THUGS, the name applied to a secret and once widely spread society among the Hindus, whose occupation was to waylay, assassinate and rob all who did not belong to their own caste. This they did, not so much from their cupidity, as from religious motives, such actions being deemed acceptable to their goddess Kâlî. The name is sometimes applied in America to "holdup" men, or highwaymen.

THULE, *thu'le*, or **ULTIMA THULE**, the name given by the ancients to the most northerly country with which they were familiar. According to some accounts, it was an island, six days' voyage to the north of Britannia, and, therefore it has often been identified with Iceland; other writers claim the name to have been given to one of the Scotch islands, or to the coast of Norway.

THURSDAY, *thurz'day*, Thor's day, the fifth day of the week, so called from the old Teutonic god of thunder, Thor. The American Thanksgiving Day is always designated the last Thursday of November, by precedent. The day before Good Friday is called Maundy Thursday and Holy Thursday.

THWAITES, *thwayts*, REUBEN GOLD (1853-1913), an American historian, born in Dorchester, Mass. He moved in 1866 to Wisconsin, where he later became editor of the *Wisconsin State Journal*, at Madison. Among his published volumes are *Down Historic Waterways*, *The Colonies*, 1492-1750, and several biographies. He has also edited a number of historical works, the best-known being *The Jesuit Relations*.

THYME, *time*, a small plant of the mint family, a native of the south of Europe, frequently cultivated in gardens. It has a strong aromatic odor and yields an essential oil, used for flavoring purposes.

TIAN-SHAN, or **THIAN-SHAN**, *te ahn'-shahn'*, a range of mountains in Central Asia, 1,500 miles long, extending in a northeastward direction from the plateau of Pamir to the Desert of Gobi, and constituting the watershed between the basins of the Dzungaria and the Balkash. It is also closely linked with the Altai Mountains, and forms a part of the great transcontinental barrier, bordering on the northern edge of the central plateau of Asia. The central portion of the range, with its slopes always covered with snow, has an elevation of from 15,000 to 20,000 feet. Glaciers many square miles in extent are also found here in great numbers. The lower parts of the slopes, to an altitude of from 9,000 to 9,500 feet, are dense with forests. Numerous roads and passes over the mountains connect China, West Turkestan and Persia.

TIA'RA, the name given originally to the cap of the Persian kings, but now to the triple crown of the Pope. The tiara of the Pope is a high cap of gold cloth, encircled by three coronets, with an orb and cross of gold at the top. From either side hangs a fringed and embroidered pendant. The cap was first adopted by Nicholas I, in the ninth century, and later Popes added the coronet.

TI'BER, the second largest river of Italy, 245 miles in length, rising in Tuscany, in the Apennines, and flowing southward into the Mediterranean by two mouths. The Tiber is noted for the large delta at its

mouth and for its historic associations. It traverses the city of Rome, forming the island anciently called *Insula Tiberina*.

To check the disastrous floods of past years costly embankments have been constructed at Rome. Because it deposits large quantities of yellow mud and sand, it is often known as the "Yellow Tiber;" the Romans also affectionately called it "Father Tiber." Through Rome it has been canalized, and it is also spanned there by a number of fine bridges. During high water it is navigable for about thirty miles north of Rome.

TIBE'RIUS (42 B. C.-A. D. 37), the second emperor of Rome, the son of Tiberius Claudius Nero. Tiberius became consul in his twenty-eighth year and was subsequently adopted by the Emperor Augustus as his heir. In A. D. 14 he succeeded to the throne, without opposition. Dangerous mutinies broke out shortly afterward in the armies posted in Pannonia and on the Rhine, but they were suppressed by the exertions of the two princes, Germanicus and Drusus.

Tiberius was a man of genius and his reign was characterized by an extraordinary mixture of tyranny with occasional wisdom and good sense. Tacitus records the events of the reign, including the suspicious death of Germanicus, the detestable administration of Sejanus, the praetorian prefect, and the retirement of Tiberius to the Isle of Capri, where he lived an infamous and dissolute life. Sejanus, aspiring to the throne, fell a victim to his ambition in the year 31; and many innocent persons were sacrificed to his suspicion and cruelty, for spies reported all that occurred in Rome.

TIB'ET, or **THIBET'**, called a dependency of China, but declaring its independence, is located in the center of the continent of Asia. It is surrounded on three sides by high mountains, including the lofty Himalayas to the south, and has an altitude of from 14,000 to 17,000 feet, comprising the most extended area of elevated plateaus on the globe. For this reason, Tibet is sometimes called "the roof of the world."

On account of its high altitude and rarified atmosphere, Tibet has an inhospitable climate, subject to great extremes of heat and cold. Violent winds sweep over the plateaus at all seasons. The western part is largely desert, rainfall being shut off by the mountains. The southern and eastern

parts are fertile, being watered by the upper courses of the Indus, Sutlej, Ganges and Brahmaputra rivers. The country contains numerous lakes, many of which, having no outlet, are salt.

The population of Tibet is sparse, numbering somewhat more than 3,000,000, two-thirds of whom live in the southeastern part, in the Brahmaputra valley. The main crops of the fertile regions are barley, wheat, buckwheat, potatoes, turnips, cabbages and pulse, with a few hardy fruits. Sheep and yaks are extensively raised, their owners taking them up the mountain sides during the short summer season for pasturage, and driving them down into the valleys as the cold becomes unendurable.

Tibet has no large industries, but the people are skilful weavers, embroiderers, and metal workers. They make a durable woolen serge which, with sheep skin, forms the chief material of their clothing. They export wool to China and India by trains of pack animals, bringing back in exchange, tea, cotton, silk, sugar, leather goods, etc. Mineral wealth is considerable, but has been little developed. Gold, silver, iron and coal are abundant; also turquoise, lapis lazuli and other stones. Salt, nitre and borax are valuable products.

The Tibetans, as indicated by their language, are of Mongolian extraction, though they have varied greatly from the original type, being largely mixed with the Chinese and the Indians of the bordering countries. Their religion, known as Lamaism, is an offshoot of Buddhism, modified by numerous primitive customs and superstitions. Polyandry is common, and polygamy is also practiced by the wealthier classes. The country supports large numbers of lamas, or celibate priests.

Because of its inaccessibility and its policy of isolation, Tibet, up to the beginning of the present century, was taken little account of by the outside world. China made little attempt at authority, and the Grand Lama, head of both Church and state, ruled unmolested from the capital at Lhasa. In 1904 the British government in India sent an armed expedition to Tibet, which compelled important trade concessions to Great Britain. This brought a protest from the Chinese government, which demanded China's recognition as the suzerain of Tibet. Lengthy negotiations followed, and by a

trade agreement made in 1908 Great Britain and Russia agreed not to enter into negotiations with Tibet except through the Chinese government. In 1911 Tibet revolted from China, and Great Britain denied China the right to send an expedition to reconquer the territory. In 1914 Great Britain and Tibet signed a treaty adjusting relations between the three nations which China refused to sign, being thereupon notified by Great Britain that until it signed it would be deprived of all rights it had hitherto enjoyed.

TIC DOULOUREUX, *tik doo loo roo'*, a form of neuralgia, which affects the facial nerve and is characterized by acute pain, attended with convulsive twitchings of the muscles. It occurs on one side of the face and may be caused by a diseased tooth, by inflammation in the air passage, by exposure, to cold, by dissipation and by other diseases. The natural remedy is removal of the cause, though sometimes warm applications will bring temporary relief. A local operation on the affected nerve is sometimes resorted to.

TICKS, a family of tiny eight-legged parasitic insects, with oval or rounded bodies, and with mouths in the form of suck-



TICKS, MUCH ENLARGED

Wood tick; a, mature dog tick; b, gorged with blood, viewed from above; c, viewed from below.

ers, by means of which they attach themselves to mammals and birds. They subsist on the blood of their victims. The common wood tick is widely distributed throughout the damp woods in the United States and Canada and is often very annoying to persons. It burrows into the flesh and generally is not noticed until gorged with blood, when it is difficult to remove. See ARACHNIDA.

TICONDEROGA, *ti kon der o'ga*, BATTLE OF, Ticonderoga is a village in Essex County, N. Y., noted as a battle ground in three wars. The first battle was waged in 1609, when Champlain won a victory over the

Mohawk Indians. In 1775 a powerful fortress was built near the site of the village by the French. It was held by Montcalm in 1757 and successfully resisted a vigorous attack by the British under General Abercrombie. It was captured by General Amherst for the English, after a long siege, in July, 1759. One of the first movements in the Revolutionary War was an American expedition against Ticonderoga, undertaken by a body of Green Mountain Boys, under Ethan Allen, and a force of continental troops, under Benedict Arnold. It was captured May 10, 1775, by Ethan Allen, without the loss of a man. It was on this occasion that Allen made his famous reply to the British general who inquired by what authority he demanded the surrender of the fort—"In the name of the Great Jehovah and the Continental Congress." Ticonderoga was retaken by Burgoyne in 1777, was later abandoned and was reoccupied in 1780. Ruins of the barracks and fortifications are still to be seen.

The village of Ticonderoga is about 100 miles north of Albany, on an elevated promontory, between Lake Champlain and Lake George. It is the center of a rich graphite region, and for years has furnished almost all of this material produced in the United States. Population, 1910, 2,475; 1915 (state census), 2,918.

TIDES, the periodical rise and fall of the water of the ocean, caused by the attraction of the sun and moon. The tide rises for about six hours, remains stationary for a short time, then begins to recede and continues to fall for the next six hours. The rise is called *flood tide*, and the fall, *ebb tide*. When the water has reached its height, it is called *high water*, and when it has reached its lowest point, it is at *low water*. Every place on the coast has two high and two low tides during the twenty-four hours; but the mean interval between successive high tides is about twelve hours and twenty-six minutes, and the hour of the day at which high or low water is greatest is later each day by about fifty-two minutes.

Tides are caused by the attraction of the sun and moon, but the moon, being so much nearer the earth, exerts by far the greater influence, notwithstanding it is much smaller than the sun (see GRAVITATION). This attraction causes a rise of water, or *tidal wave*, nearest the moon; and as the earth rotates

on its axis, the tendency of this wave is to keep directly under the moon. Hence, it travels from east to west, but it lags somewhat behind the moon, on account of the time required to draw the water into its position. Since the attraction of bodies decreases as the square of the distance between them increases, it follows that the points of the moon's greatest and least attraction are at those points on the earth's surface which are respectively the nearest

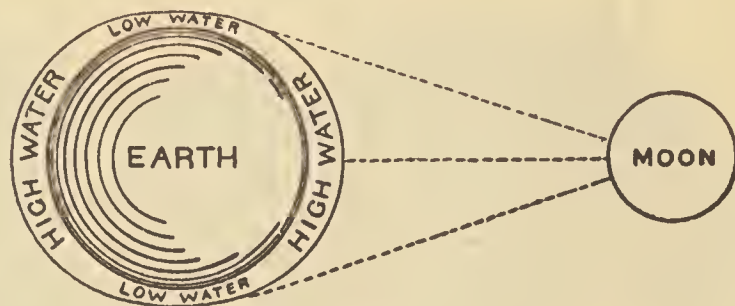


FIG. 1

and the farthest from the moon. At the former point the attraction is greater than the average, and the water is pulled up toward the moon; the solid portions of the earth are attracted the same as the water, so the earth as a whole is drawn toward the moon, away from the point on the opposite side where the attraction is less than the average. The pressure of the water upon either side of this pushes the water up on the side near the moon and forms a tidal wave, which balances that on the opposite side. Therefore we have high tide at the opposite ends of the long diameter of the ellipse, and low tide at the points midway between.

Twice a month, at new and at full moon, the attraction of the moon and sun is combined to act upon the tides at the same points, and the highest tides of the month occur. This is known as *spring tide* and is illustrated in Fig. 2. Near the first and fourth quarters of the moon, the earth, sun and moon are in such relative positions that

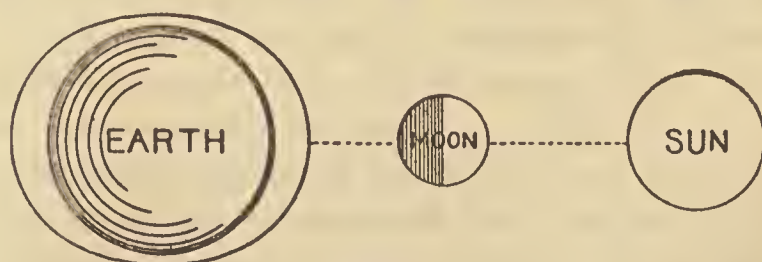


FIG. 2

the attractions of the sun and moon act nearly at right angles upon the earth and we have the lowest tide, called the *neap tide*. This is illustrated in Fig. 3.

In the open ocean the tidal wave is merely a broad swell that is scarcely perceptible, but on the coast its height varies according to

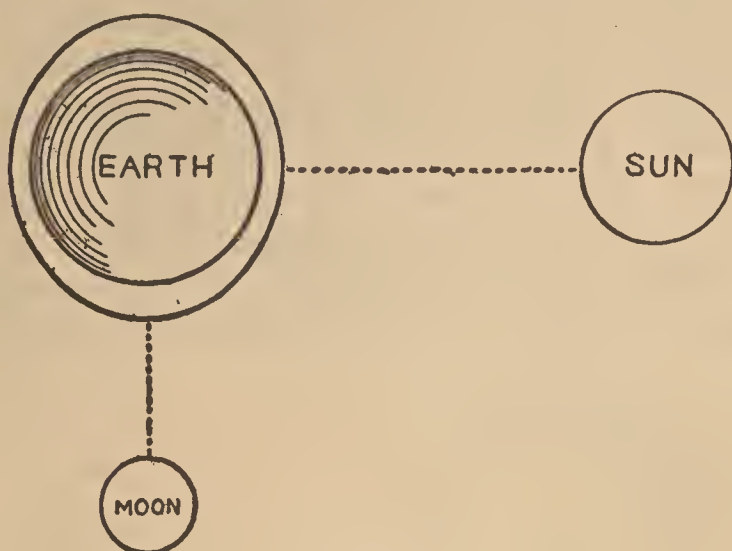


FIG. 3

the coast line and the character of the locality. If the coast contains inlets, which narrow towards their head, like the Bay of Fundy, the tidal wave grows higher as it is shortened by the converging shores, and the tide rises very high. If the coast contains a promontory or other projection, which divides the tidal wave, as the Florida peninsula, the tendency is to lower the tide. Because of the irregularity of the coast and of the bed of the ocean, tides do not occur at all places on the same meridian at exactly the same time. Mariners' charts contain the variations in tide for all harbors and are frequently accompanied by tables, which give the time of the tides for each harbor and each month in the year.

TIEN-TSIN, *tyen'tsin*, CHINA, is situated on the Pei-ho, where the river forms a junction with the Grand Canal, seventy miles southeast of Peking, with which it is connected by railway. The city is surrounded by high walls, which are surmounted by towers. The houses in the Chinese quarter are low, and the streets are unattractive. The foreign quarter, which is outside of the Chinese city, is well built and resembles a modern European or American town in nearly all respects. Tien-tsin is an important trade center and one of the chief seaports of China. It has railway connections with the coal district of Kaiping, Manchuria and Hankow, and is open to vessels of the leading European nations and the United States on equal terms. During the Boxer outbreak in 1900, Tien-tsin was the point from which the relief expedition of the allied powers started for Peking. Population, estimated, 800,000.

TIERRA DEL FUEGO, *tyer'ah del fwa'go*, a group of islands situated off the southern extremity of South America, from which the archipelago is separated by the Strait of Magellan. It consists of a large island, called King Charles South Land, and several smaller islands west and south of it, the total area being about 27,000 square miles. All the islands are mountainous, and the climate, modified by warm currents, is habitable, the population numbering about 2,500. There are forests and pasture lands, and agriculture and cattle-raising are the chief occupations. Politically the archipelago is divided into two groups. The eastern part, including the largest island of the group and Staten Island, belongs to Argentina; the western, to Chile. On one of the small islands of the Chilean group is situated Punta Arenas, the most southern city in the world; and on another, the southernmost of the group, is Cape Horn.

TIF'FIN, OHIO, the county seat of Seneca County, forty miles southeast of Toledo, on the Sandusky River, and on the Pennsylvania, the Baltimore & Ohio and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. It is the seat of Heidelberg University, the College of the Ursuline Sisters and a school of music. The city has a Federal building, a Carnegie Library, a fine soldiers' monument and the national orphan's home of the Junior Order of United American Mechanics, housing about 400 children. There are deposits of clay and glass sand in the vicinity, and the industrial establishments include machine shops, glass works, potteries, woolen mills and mitten factories. The place was settled in 1817 by Erastus Bowe, and was chartered as a city in 1836. Population, 1910, 11,894; in 1920, 14,375, a gain of 21 per cent.

TIFLIS' (Russian pronunciation *tyee flyees'*), formerly a city of Russian Transcaucasia, now the capital of the new republic of Georgia, is situated on both banks of the unimportant Kur River. The city occupies a beautiful valley, at the foot of the Caucasus Mountains and is interspersed with numerous vineyards and orchards. The Russian part of the city is built on modern plans and contains good hotels, stores, theaters and other buildings, resembling those of the cities of Western Europe. The native quarter is typically Oriental. The public gardens and botanical garden

are objects of interest, and the educational institutions include a conservatory of music, a railroad institute, a physical observatory and the Caucasian Museum. Manufactures include tobacco, leather and cotton yarn.

TIGER, the largest and most powerful animal of the cat family. It is about the height of the lion, although the body is longer and more slender, while the head is more rounded and has no trace of a mane. The males are considerably larger than the

TIGER LILY, a tall garden plant brought to America from Eastern Asia, its early home. Its markings are somewhat similar to those of the tiger, and it is so named for this reason; the blossoms are orange-red, splashed with black. The plant grows from bulbs which in Japan and China are used as food. It often attains the height of five feet and bears alternate, lance-shaped, deeply-veined leaves. At the point where the leaves join the stalk, small black bulblets grow, which, after cling-



TIGER

females, and leave a more nearly square and less oval footprint. The average length of the male is about $9\frac{1}{2}$ to 10 feet from the nose to the tip of the tail; the average weight is 500 pounds. It is of a bright fawn color above and a pure white below, crossed irregularly with black stripes. Its colors prevent it from being easily seen in the shades of the jungles.

The tiger attains its full development in India, the name of *Bengal Tiger* being generally used as synonymous with those specimens which represent the typical and most powerful of the species. It generally selects the neighborhood of water courses as its home and springs upon the animals that approach to drink. *Man-eaters* are tigers that have acquired a special liking for human prey.

The tiger combines with the strength of a lion, a fierceness, stealth and activity peculiar to itself, so that natives fear it more than any other animal. The natives destroy tigers by means of poisoned arrows or capture them in grass-covered pits and other traps.

ing to the stem for a while become detached and take root to produce other plants, which bloom in two to three years. See **LILY**.

TIGRIS, a river which, with the Euphrates, encloses the historic region of Mesopotamia. In its valley flourished two great civilizations—the Assyrian and Babylonian—long before the glorious days of Greece. Its principal sources start on the slopes of the Anti-Taurus Mountains in Central Armenia. After the junction of the headwaters the river flows in a winding southeast course of about 950 miles, uniting with the Euphrates at Garmat Ali. The two streams form the Shat-el-Arab, which enters the Persian Gulf after a ninety-mile course. Although it is shorter than its sister stream, its volume is greater, its flow swifter. Its chief branches are on the eastern side; the largest of these are the Diyala and the Greater Zab. In its course the Tigris passes the ruins of Nineveh, on the east bank, opposite the modern town of Mosul. Lower down it flows through Bagdad and farther on passes the ruins of Ctesiphon, then those of Seleucia, in splendor once the

rival of Babylon. Ocean craft ascend to Bagdad; smaller vessels may go to Mosul. The valley of the Tigris was the scene of desperate fighting in the course of the World War. See MESOPOTAMIA.

TIL'DEN, SAMUEL JONES (1814-1886), an American statesman and philanthropist, born in New Lebanon, N. Y. He was educated at Yale College and at the University of the City of New York and was admitted to the bar in 1841. He was elected to the state assembly in 1845, where he advocated the construction of canals by the state, and in 1846 he was a member of the State Constitutional Convention. By 1868 he had become the leader of the Democratic party in New York State. His determined opposition and practical measures broke up the "Tweed Ring" (see TWEED, WILLIAM MARCY), the prosecution of which he successfully conducted.

Tilden was elected governor in 1874, served the state with sagacity and honesty and in 1876 was the Democratic nominee for President against Rutherford B. Hayes. He received a majority of the popular vote and was defeated in the Electoral College by one vote, after a long dispute over returns, which was decided by an electoral commission (see ELECTORAL COMMISSION). The greater portion of his fortune, estimated at \$5,000,000, he bequeathed for the endowment of a public library in New York City, but after a long contest over the will, only about \$2,000,000 was so applied.

TILE'FISH, a deep-sea fish accidentally discovered in 1879 by fishermen trawling for cod in warm currents near Nantucket. In 1882 these fish were nearly exterminated by the cold waters which the gales of that year forced into the warmer currents inhabited by them. Their dead bodies were seen floating in countless thousands on the ocean surface. Since then their numbers have been gradually increasing. The flesh is finely flavored, and is excellent food. The fish has a large head, is brilliantly-colored and has an average weight of fifteen pounds. A peculiarity is a fleshy protuberance on the top of the head. The name is adapted from the long scientific name of the fish, which means *crested tilus with a chameleonlike head*.

TILES, *tile'z*, a term applied to a variety of articles, made either for ornament, such as inlaid paving tiles, or for use, as draining and roofing tiles. The latter are made

similarly to bricks and of similar clay (see BRICK). Floor tiles in which the body of the tile is in one color and a special pattern is produced by the use of other colors, are known as *encaustic tiles*. When designs in floors or walls are made by the arrangement of tiles of different colors, the result is said to be a *mosaic*.

TILL'MAN, BENJAMIN RYAN (1847-1918), an American Senator, famous in the past generation, was born in Edgefield County, S. C. He received an elementary education, but left school in July, 1864, to join the Confederate army, in which he did not serve long, because of loss of sight in one eye. After the war he became a planter in his native state; in 1886 he entered politics as the champion of industrial and technical education, and succeeded in securing the establishment of several schools, the largest of their kind in the South. He gained a large following as an advocate of other reforms and was elected governor in 1890. He was reelected in 1892, his administration being important by reason of the passage of the state liquor dispensary law. In 1895 he was elected United States Senator, and was subsequently reelected for four terms. His fiery and enthusiastic speeches, especially his attacks upon President Cleveland in 1895-1896, won him the title, "Pitchfork Ben."

TIL'LY, JOHANN TSERKLAES, Count of (1559-1632), one of the most celebrated generals of the seventeenth century. He was born at the castle of Tilly in Belgium and received his military training in the Spanish armies. In 1610 he was selected by Duke Maximilian of Bavaria to reorganize his army, and at the outbreak of the Thirty Years' War he was made commander of the forces of the Holy League. In 1620 he gained the victory of White Mountain, near Prague, and in 1621 he subdued Bohemia. In the years that followed he overpowered Christian IV of Denmark, who had entered the war on the side of the Protestants and forced him to withdraw. Tilly became commander of the imperial army in 1630, and in 1631 he stormed Magdeburg. This, his thirty-sixth victory, closed his list of triumphs. On Sept. 17, 1631, he was defeated by Gustavus Adolphus at Breitenfeld, near Leipzig, and in the next year, in a contest with the Swedish king, near the Lech, he was mortally wounded.

TIMBUK'TU, or **TIMBUC'TOO**, a town of French West Africa, situated on the south-

ern edge of the Sahara Desert, nine miles north of Kabara, its port on the Niger river. It is notable as being the center of caravan trade between North Africa and the regions south and west of the Niger. Gums and rubber, gold, ivory, ostrich feathers, wax, salt, hardware and cheap cloth, to the value of millions of dollars annually, are exchanged here, mainly by barter. The buildings of Timbuktu are chiefly one-story mud hovels, though the city contains a number of beautiful mosques, one of which dates from 1325, and a number of European churches and schools. The town was founded in 1077 by the Tuareg tribe, and has long been a center of Mohammedan learning. It passed into possession of the French in 1894.

TIME, STANDARD. See **STANDARD TIME**.

TIM'OTHY, a coworker with the Apostle Paul, probably born in Lystra, in Asia Minor. His father was a Greek, and his mother was a Jewess. He went with Paul to Philippi and Beroea and remained alone in the latter city, afterward rejoining the apostle at Athens, from which he was sent to Thessalonica. After remaining there some time, he joined Paul at Corinth. Five years later, he was at Ephesus, whence he was sent with Erastus into Macedonia and Achaia, to prepare the churches for Paul's meditated visit. Timothy met the apostle in Macedonia and preceded him on his journey to Jerusalem. He was at Rome with Paul at the time when the epistles to the Colossians, Philippians and Philemon were written. He is said to have been martyred in the reign of Domitian or Nerva.

TIMOTHY, or **CAT'S TAIL**, once called herd's grass, is a grain of high economic value, widely cultivated for fodder. It grows to a height of from one to three feet and bears, on the tips of slender stems, cylindrical spikes composed of tiny florets. The plant is perennial, but springs from seed and matures rapidly in the same season in which it is sown, if conditions are favorable. The yearly production of timothy, alfalfa and clover in the United States at normal prices is valued at over \$1,000,000,000; in Canada, \$150,000,000 to \$170,000,000.

TIMROD, **HENRY** (1829-1867), a lyric poet of the Southern states, native to Charleston, S. C. He contributed poems to *Russell's Magazine* and the *Southern Literary Messenger* during the years preceding the Civil War, published a volume of poems in 1860,

was war correspondent for the *Charleston Mercury*, and during the war was assistant editor of the *South Carolinian*, published in Columbia. His property and health were swept away in the Federal attack upon Columbia, and he died in great physical suffering and poverty. An edition of his poems was published in 1873, and a revised memorial edition was issued in 1899.

TIMUR, *te moor'*, generally known as Tamerlane (1336-1405), was a celebrated Asiatic conqueror born near Samarkand. His ancestors were chiefs of his native district, and Timur, by his energy and ambition, made himself ruler of all Turkestan (1370). By degrees he conquered Persia and the whole of Central Asia, and extended his power from the Great Wall of China to Moscow. He invaded India in 1398, and overran it from the Indus to the mouths of the Ganges, massacring, it is said, on one occasion, 100,000 prisoners. After this he marched on Asia Minor and successfully made war on the Turks, subjugating Bagdad, plundering Aleppo, and burning Damascus. He then undertook to conquer China, but died in camp of fever. He was fanatical in his devotion to Mohammedanism, well versed in the Koran, but was one of the most cruel of warriors. In times of peace he was a patron of science, art and letters.

TIN, a hard, white, ductile metal. It appears to have been known in the time of Moses; and the Phoenicians traded largely in the tin ores of Cornwall. The mountains between Galicia and Portugal, and those separating Saxony and Bohemia, have also been productive of tin for centuries and still continue unexhausted. Tin is found in great quantities in the Malay Peninsula, the island of Banca, India, Mexico, Chile, Peru, Bolivia, the United States, Australia and other countries, but the most important mines are at Cornwall, England, and on the Malay Peninsula. From the latter, nearly half of the world's supply has been obtained for many years past, but the output is now declining. The annual output for the world is about 135,000 tons.

Metallurgy of Tin. There are only two ores of tin, the native dioxide, called *tin stone* and *cassiterite*, and the double sulphide of tin and copper, called *tin pyrites*. The former is the only ore used for obtaining metallic tin. It occurs in various crystallized forms—in deep lodes blended with several other

metals, as arsenic, copper, zinc and tungsten, when it is known as *mine tin*, or in disseminated masses in alluvial soil, in which state it is called *stream tin*. Mine tin, when reduced to the metallic state, yields *block tin*, while stream tin yields a purer sort, called *grain tin*.

Its Preparation for Commerce. The ore is first ground and washed and is then roasted in a reverberatory furnace, to expel the sulphur and arsenic. Mixed with limestone and fuel, it is again melted in a furnace for about eight hours, the earthy matters flowing off with the lime, while the oxide of tin, reduced to a metallic state, falls by its own weight to the bottom and is drawn off. The tin, still impure, is then moderately heated, when it melts and flows off into the refining basins, leaving the greater part of the foreign metals in a solid state. The molten tin is stirred, to disperse the gases, and when partially cool, it separates into layers, the upper consisting of nearly pure tin, while the under is so impure that it again must be melted. The upper layer is removed, cast into blocks and sold as *block tin*, the purest specimens being called *refined tin*.

Pure tin has a fine white color like silver and is a little more than seven and one-fourth times heavier than water. It has a slightly disagreeable taste. Its hardness is between that of gold and lead, and it is very malleable. Tin is flexible, and when bent emits a crackling sound, sometimes called the *cry of tin*. It loses its lustre when exposed to the air, but undergoes no further alteration.

Its Properties. Tin will unite with arsenic and with antimony, but does not readily combine with iron. Combined with copper it forms bronze, bell metal and several other useful alloys. With lead it forms pewter and solder of various kinds. *Tin plate* is formed by dipping thin plates of iron into melted tin. These are afterward cleaned with sand and steeped for twenty-four hours in water, acidulated by bran or sulphuric acid. Tin is principally employed in the formation of alloys. Its oxides are used in enameling and for polishing metals, and its solution in nitro-muriatic acid is an important mordant in the art or dyeing rendering several colors more brilliant and permanent.

Tinfoil. Tin hammered into thin sheets is called tinfoil, although much of the tinfoil now contains lead. It is used to wrap small articles, such as fine soaps, tobacco, yeast, etc., to protect them from air and moisture.

TINTORETTO (1518–1594), whose real name was JACOPO ROBUSTI, was one of the greatest painters of the Italian Renaissance. His father was a Venetian dyer, and the nickname Tintoretto means *little dyer*. He studied under the greatest painters of his day, but was largely self-taught, subjecting himself to the most severe course of training. He dissected bodies to learn anatomy and worked by daylight and by lamplight to study light effects. His output was prodigious, and his works are numbered by hundreds. They are to be seen in all the great galleries and include mythological, religious and historic subjects, many of them unusually large pieces. His *Paradise*, occupying an entire wall in the old Ducal Palace, Venice, is the largest oil painting in the world.

Tintoretto established his reputation with a series of pictures on the subject of Saint Mark, the patron saint of Venice. One of these, *The Miracle of Saint Mark*, in the Academy, Venice, was pronounced, by the art critic Taine, the greatest painting in Italy. It is remarkable for intense dramatic action, exquisite color, fine modeling of the figures and masterly treatment of light. For the guild house of San Rocco he did some of his finest work, including a magnificent *Crucifixion*, *Paschal Feast* and *Moses Striking the Rock*. Among his last religious pictures was a series depicting scenes in the life of Christ. Some of these are *The Visitation*, *The Annunciation*, *Christ Before Pilate*, *Ecce Homo* and *Resurrection*. A number of his most charming pieces illustrate pagan and Christian myths. Only a few of his works may be seen in America. *The Doge in Prayer Before the Redeemer* and *Miracle of the Loaves and Fishes* are in the Metropolitan Museum, New York, and a canvas entitled *Senator*, is in the Gardner Collection, Boston.

TIPPECANOE, *tip pe ka noo'*, BATTLE OF, a battle fought November 7, 1811, near the site of the present village of Battleground, in Tippecanoe County, Ind., between a force of 800 Americans, chiefly Indiana and Kentucky militiamen, under General William Henry Harrison, and a force of Indians, estimated at about 6,000, under the command of chiefs White Loon, Stone Eater, Winamac and the Prophet, the last a brother of Tecumseh. Tecumseh and the Prophet had created much discontent among the Indians of the Northwest, and General Harrison had finally found it necessary either to secure a

treaty with them or to subdue them by force. He finally proceeded to their headquarters at a village on the Tippecanoe and arranged for a meeting with the Prophet, but before the conference could be held the Indians had attacked the American camp. After a fierce contest, lasting more than two hours, the Indians were driven from the field, and their village was completely destroyed by the Americans. The battle led to a general uprising of the Indians in the Northwest, in connection with the War of 1812. General Harrison gained such prestige in this campaign that he was made commander of the American troops in the West.

TISSOT, *tis so'*, JAMES JOSEPH JACQUES (1836-1902), a French painter, born at Nantes, famous chiefly for a series of water colors, more than three hundred in number, illustrating the life of Christ. These, the result of ten years' study in the Holy Land, depart widely from the conventional treatment of religious subjects in the attempt to show Christ's actual surroundings, the supposition being that Palestine has changed little since his time. The collection is owned by the Brooklyn Institute. Tissot did not begin to paint religious subjects until after he was fifty, and then chose them as the result of a spiritual conversion. Prior to this event he had devoted his talents to representing scenes of Parisian life. At the time of his death he was engaged upon a series illustrating scenes and incidents in the Old Testament.

TISSUES, *tish'uze*, the organized collection of cells of the same sort, or fibers, of which the systems of organs are composed. Thus, we speak of *muscular tissue*, or flesh; *osseous tissue*, or bone; *adipose tissue*, or fat; *cartilaginous tissue*, or gristle; *pigmentary tissue*, or coloring matter seen in the skin; *areolar, cellular, or connective tissue*, which is widely distributed in every part of the body and serves to bind together and consolidate other parts and tissues. See BONE; CARTILAGE; CONNECTIVE TISSUE.

TITAN'IC, a steamship of the White Star Line which sank after colliding with an iceberg, causing one of the greatest marine disasters of all time. At the time of its launching the *Titanic* was the largest ship afloat (see SHIPS). It was making its first voyage, and on April 14, 1912, had reached a point about 1,000 miles southeast of Halifax. Here it collided with an iceberg and sank four hours later, early in the morning of

April 15. The *Carpathia*, hearing the *Titanic's* wireless calls for help, rushed to the scene in time to pick up the lifeboats with 745 passengers, but 1,595 persons went to their death.

TITA'NIUM, a metallic element discovered in 1789. It is not found native, but as an oxide in other minerals. Combined with silver it gives luster to that metal; combined with steel it adds hardness and toughness. When heated in air it burns with an intensely brilliant light, and is used in the manufacture of filaments for incandescent lamps, and with carbon in arc lights, to increase the brilliancy of the illumination. Titanium salts are used in dyeing, while certain compounds of titanium are used as ingredients of paint for protecting iron from the air. This element is widely distributed, though nowhere abundant. It is found in many iron ores, and in the United States is extracted from rutile.

TITANS, in Greek mythology, the giant sons and daughters of Uranus (Heaven) and Gaea (Earth). Six were men and six were women, the latter called Titanides. Uranus feared them and chained them in a dark cavern of the earth called Tartarus. Saturn, the youngest, escaped, overthrew Uranus and released his brothers and sisters. Saturn was in turn overthrown by his son Jupiter.

TITHES, a tenth part of the profit derived from the use of land, which from the earliest times has been the common tax rate for civil and religious purposes. Moses levied upon the Jews a tax of one-tenth of their possessions for the support of the priests. In Christian churches tithes have been one of the methods employed for the support of the clergy. In England tithes are paid in support of the parish in which the land is held. In the United States the only tax levied for religious purposes is that which the Mormon Church exacts of its members.

TITIAN, *tish'an*, or **VECELLIO**, TIZIANO (1477-1576), one of the world's greatest masters of color and head of the Venetian school of painting. He was born at Pieve de Cadore, in the Carnic Alps. He studied under Giovanni Bellini of Venice, and later, in 1507, became associated with the painter Giorgione in the execution of certain frescoes. So closely did he imitate the latter's manner that his works were sometimes taken for those of this master.

About 1511 Titian began to work along independent lines. In that year he went to

Padau, where he executed three remarkable frescoes, still to be seen, and painted the pictures *Tribute Money* and *Sacred and Profane Love*. In 1530 Emperor Charles V invited him to Bologna to paint his portrait; thereafter his life was a succession of triumphs, and most of the foremost personages of his day were eager to sit for him.



TITIAN

Titian excelled as much in landscape as in figure painting, and was equally great in ideal heads and in portraits, in frescoes and in oils. As a colorist he is almost unrivaled, and his pictures often reach the perfection of sensuous beauty. He died at the age of 100 years and was buried in the Church of the Frari, in Venice. Among his principal productions are *The Entombment*, *The Assumption of the Virgin*, *The Crucifixion*, *Descent from the Cross*, *Mater Dolorosa*, *Christ Crowned with Thorns* and *Rape of Europa*.

TITICACA, *tit e kah'kah*, LAKE, the largest lake of South America, picturesquely situated, partly in Peru and partly in Bolivia. It occupies the center of a lofty valley and is surrounded by the mountains forming the main chain of the Andes. It is 130 miles long and thirty miles wide at its widest point; its area is about 5,000 square miles, and its height above sea level, 12,500 feet. Titicaca contains several islands, is fed by a number of mountain streams and discharges through the Desaguadero River, which flows from its southern extremity. The region around the lake contains many interesting architectural ruins of the old empire of the Incas. Small steamers ply between the ports of Puna, in Peru, and Guaqui, in Bolivia, and supplement the railway connections.

TITLE, *ti't'l*, that which constitutes the legal ownership of property. It has two essential elements, possession and right of possession, and may be obtained by original acquisition, as in the case of patent or copyright; by gift, contract or sale, or by act of law, as in bankruptcy, judgment, intestacy or marriage.

In most countries a system of examination and registration of titles by a recognized officer exists, which assures the purchaser of real estate a perfect title without personal investigation. See **TORRENS SYSTEM**; **DEED**.

TITLES OF HONOR, words or phrases attached to the names of certain persons, in virtue of particular offices or dignities possessed by them, or as marks of distinction and special rank. They have existed probably among all peoples. Such were, in Rome, the titles *Magnus* (Great) and *Africanus* (African), and the epithets *Caesar*, the name of a family, and *Augustus*, which were gradually applied to all who filled the imperial throne. In modern times such designations as prince, duke, king, lord, Royal Highness, His Excellency, are common.

TITMOUSE, **TIT**, or **TOMTIT**, a group of small hardy birds, characterized by long, soft plumage, of which a number of different species inhabit most parts of the world. They flit continually from branch to branch, devouring insects' eggs and larvae, thus rendering incalculable service. The tits live in trees or bushes, and hop, climb or cling, often with head downward, prying into crevices in the most curious manner. Their shrill and wild notes are sometimes varied by pleasing musical sounds.

In the United States the birds are known as *chickadees*, a name given in imitation of their calls. The *black-capped chickadee* is one of the most familiar and characteristic of northern birds, everywhere a great favorite, particularly as it often stays in rather cold latitudes throughout the winter, when its cheery exclamations are especially welcome. This chickadee is a very sociable, friendly bird; with little care it may be kept about quiet homes, and if coaxed will feed from the hand.

TITUS (40-81), a Roman emperor, the eldest son of Vespasian. He served with credit as a military tribune in Germany and Britain, and as commander of a legion accompanied his father in the war against the Jews. When Vespasian became emperor (69), Titus was left to conduct the war in Judea. He took Jerusalem (A. D. 70), and after visiting Egypt returned to Rome in triumph and was associated with his father in the government of the Empire. He became sole emperor in 79 and won distinction as an enlightened and generous ruler. He was hailed by the populace as "the Friend and the Delight of Mankind."

Arch of Titus, a Roman triumphal arch built by Domitian in A. D. 81, to commemorate the taking of Jerusalem by Titus. It is located on the Sacred Way, facing the Forum.

TITUS, a disciple and assistant of the apostle Paul; the person to whom one of the canonical epistles of the New Testament is addressed. He was a Gentile by origin.

T. N. T. See TRINITROTOLUOL.

TOAD, *tohd*, a small animal, resembling a frog, which lives in damp, shady parts of gardens or fields. Toads have thick, bulky bodies and short legs, and a rough, warty skin. They have neither teeth nor ribs, and their skin absorbs the water they drink. They are slow and clumsy in their movements, their dull color, similar to the ground, giving them protection against their foes. Toads generally avoid water, but in early spring they seek water in which to lay their eggs. These are very small and numerous, and are held together by a long band of jelly-like substance. From the egg toads develop through the tadpole stage, like the frog. Their food consists of insects and grubs, which makes them of great service to the farmer or gardener. They capture their prey mainly during twilight and at night. Insects are caught by a sudden shooting out of the tongue, which is provided with a sticky fluid, and are swallowed whole.

The *North American* toad is usually brown or green, and is found both on dry land and in swampy regions. The bite and saliva of



TOAD

the *common toad* of Europe were formerly considered poisonous, but no venom or poison apparatus of any kind exists in these creatures. The toad is easily tamed and exhibits a considerable amount of intelligence as a pet.

TOADSTOOL. See MUSHROOMS.

TOBACCO, *toh bak'o*, a plant of the nightshade family, extensively cultivated for its leaves, which are used for smoking and chewing and for snuff. There are several species, but that known botanically as *Nicotiana tabacum* is the one most extensively culti-

vated. It has an erect stem, that grows from four to six feet high and produces at the top a cluster of small, rose-colored flowers. The leaves are the important part of the plant. They are oblong and pointed and grow di-



TOBACCO

rectly from the stalk, often attaining a length of eighteen to twenty-five inches and a breadth of eight or ten inches. The plant is slightly poisonous, owing to the presence of nicotine.

Cultivation. Early in January the beds are covered with fertilizers, and then the seed, which is like a quantity of ground black pepper, is carefully and evenly sown over the ground and whipped in with a brush. A little while after the seed is sown, the bed is covered over with a flimsy cotton fabric, of lighter weight than cheese cloth, to guard against and equalize the frequent changes of weather at this season of the year, and as a protection against the flea bug, which would entirely destroy the young plants as soon as they show above ground. Forty days' time is required for the tobacco to sprout. The plants are large enough for transplanting early in May. The ground is thoroughly pulverized and is laid off into furrows four feet apart, into which the fertilizer is drilled. Then every three feet in the row a hill, or *pot*, is made.

The plants are distributed into the pots, and the dirt is settled tightly around the young plant. One good workman will set two acres a day. When the plant is about six weeks old, it is topped to ten or twelve leaves, and almost immediately false leaves, or *suckers*, start at every joint, beginning at the bottom. As many as three successive sets of suckers will start at the base of every leaf, and as these detract from the proper growth of the leaf, it is necessary to go over the crop each week until cutting time and pull off every new sucker.

Harvesting and Curing. In about three months after planting, the tobacco is ready to cut. When ripe, the green is dappled over with slightly yellow spots. A strong knife, similar to a butcher knife, is used for cutting. As the plants are cut, half a dozen of them are hung over a stick and laid on the ground. These sticks are taken up into a wagon and hauled to the barn. Inside the barn are two furnaces, which are arranged to be fired from the outside of the building. The flues to these furnaces are nearly horizontal and extend back and forth across the inside, to economize the heat better. Sets of horizontal poles, one above another, run across the interior, from which the sticks of green tobacco are suspended. When the barn is full, the doors are closed and the fires are started and are kept burning for four days. Beginning with a very low temperature, the heat is increased to about 100° by the end of the first twenty-four hours. Too sudden heat blackens the stems and otherwise affects the color. Beginning with the second day the temperature is increased about a degree an hour until 125° is reached, and it is held at this temperature from eight to twelve hours, after which the thermometer is started upward again, until 180° is reached, and the heat is held at that until it is noted by frequent examination that the stem of the tobacco is thoroughly killed. Then the fires are drawn, and a quantity of water is thrown in upon the ground, the vapor from which puts the brittle leaves in condition to be handled without injury. The tobacco is then taken out and stored. The lighter and even the color, the higher price it brings in the market. Some of the best varieties raised in Connecticut and Florida are grown under raised covers of cheesecloth, supported on frames.

Manufacture. The most important manufactured products of tobacco are cigars,

cigarettes, smoking tobacco, chewing tobacco and snuff. Tobacco manufacture is an important industry in the United States, Cuba and a few countries of the East. The United States government derives over \$100,000,000 revenue yearly from the tobacco manufactured in the country. The manufacture of cigars is the most important branch of the industry.

The first step in the manufacturing process consists in cleaning and stripping the leaves. Chewing tobacco is flavored with licorice, sugar, vanilla, etc. Pipe tobacco is finely cut and put up in small sacks or cans.

Cigars are made from leaves carefully selected for the purpose. The cigar consists of the core or "filler," the inner cover and the outer cover, or wrapper. The leaves must be of uniform quality, and those for the wrapper must be so shaped that they can be wound spirally.

Cigarettes are small rolls of tobacco encased in paper. They are fully described in these volumes under their titles.

Effects of Tobacco. As stated above, tobacco is a slightly poisonous plant, and its use in excess is injurious to the system, although it is generally conceded that a moderate use of tobacco is not injurious to adults. Excessive use long continued is likely to lead to irregular heart action, or cause "tobacco heart;" to benumb the nerves and cause loss of appetite, and to dull the sense of taste. Tobacco is a mild narcotic, and to this property is due the soothing effect of the cigar or pipe, but the reaction that follows is not always so soothing. Those accustomed to the use of tobacco are likely to become irritable when deprived of it for any length of time. The use of tobacco by growing boys cannot be too strongly condemned. This subject is fully treated under CIGARETTE.

Production. The United States is the largest producer, manufacturer and consumer of tobacco. The tobacco crop of the country in 1923 amounted to 1,474,786,000 pounds, valued at over \$300,000,000. The leading states, in the order of production, are Kentucky, North Carolina, Virginia, Ohio and Tennessee. Canada produces about 6,000,000 pounds a year; Japan over 100,000,000 pounds; the Philippines, a little less. Then follow Brazil and Cuba.

History. There is a tradition that credits the Chinese with using tobacco long before the discovery of America. Be this as it may,

tobacco was introduced into Europe from America, where Columbus learned of its use from the Indians. It was used in Spain and Portugal as early as 1560, and smoking became popular in England about twenty-five years later. From these countries its use spread over Europe. It is extensively used throughout Egypt, the Turkish domains, India, China and Japan. The origin of the name is unknown, but it is supposed to be derived from *Tobago*, the name of an island near Trinidad.

Related Articles. Consult the following titles for additional information:

Anti-Cigarette League Nicotine
Narcotic Snuff

TOBOG'GANING, coasting on a toboggan, that is, a sled without runners. Originally the Indians of Lower Canada used these toboggans to carry loads over soft snow. Slabs of birch about a quarter of an inch thick are fastened together side by side to make a single board, four to eight feet in length. This is curved upward at the forward end, and hand rails are placed along the side, for the coasters to cling to. The toboggan is steered with the foot or with short sticks held in the hand. In hilly countries, natural slides may be used, but artificial ones are constructed in level countries. The latter are great frameworks of timber, 40 or 50 feet high, from which a slideway, of one or more chutes, packed with ice or snow, runs down to a long level snow- or ice-packed track. The speed attained on these is very high, and the sport an exciting one. In many cities of the northern states, public toboggan slides are erected in the parks; but these are now used more by children and youths with sleds and bobs, than by tobogganists. See COASTING.

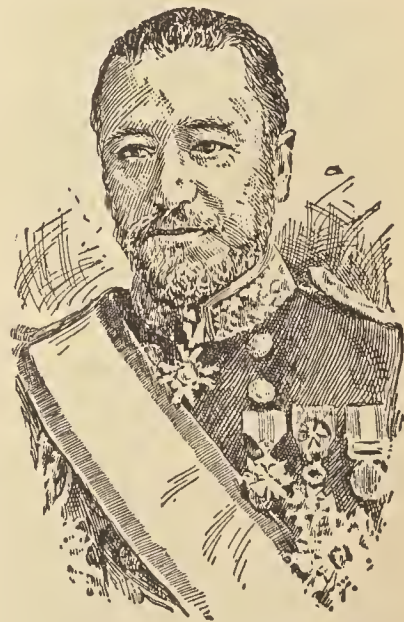
TOBOLSK', SIBERIA, chief city of the province of the same name, situated at the junction of the Irtysh and Tobol rivers and at the terminus of the North Siberian Railway. The main industries are fishing and fur dressing. Since the construction of the Trans-Siberian Railway the city has declined as a commercial center, but it still retains much of its river trade. It was founded in 1857, and it is inseparably connected with history of Russian exile in Siberia. Population, 1913, 24,800. See SIBERIA.

TOCANTINS, *to kan teens'*, a river of Brazil, which rises in the south central part of the country, flows northward and enters the southern mouth of the Amazon, generally known at this point as the Rio Para, a few

miles above Para. Its chief tributary is the Araguaya, which is nearly as large as the main stream. The length of the Tocantins is about 1,500 miles, and it is navigable in different parts of its course, but continuous navigation is prevented by falls and rapids. The tide ascends the stream for about 300 miles from the sea, and for some distance above where it unites with the lower branch of the Amazon it is eight miles wide.

TO'GA, the outer garment of the male citizen of ancient Rome. It was probably of Etruscan origin, and yet it came to be considered the distinctive badge of the Roman citizen. Authorities differ as to what were its shape and size, some of them holding that it was elliptical, while others say it was a segment of a circle. The toga of ordinary life was white in color. The *toga praetexta* had a broad purple border and was worn by children and by the curule magistrate and censors. When the young Roman was declared to be legally of age, he assumed the ordinary toga, on this account called the *toga virilis*. Persons in mourning and persons under impeachment wore the *toga pulla*, a garment of a dark color; while those who were seeking office were wont to dress themselves out in garments which had been made artificially bright by the help of chalk—hence their name of *candidati*. Under the emperors the toga as an article of common wear fell into disuse; but it continued to be worn by magistrates and in later figurative speech it was associated with law-making, so that even to-day one hears it said of a newly-elected Senator that he has "donned the toga."

TO'GO, HEIHA-CHIRO (1847-1917), a Japanese naval commander, born in Satsuma. Most of his education was received on board the *Worcester*, a British training vessel, and at the Royal Navy College, Greenwich, England. On



ADMIRAL TOGO

his return to Japan, he at once came to the front and was sent at first to Hawaii, to guard Japanese interests there. Togo was prominent in the Chinese-Japanese War and won the rank of vice-admiral. In 1900 he

was placed in command of the naval dockyards at Maizuru and did much to develop the Japanese navy. At the outbreak of the Russo-Japanese War, Togo commanded the main fleet and covered himself with laurels, gaining brilliant victories over the Russians in the harbor of Port Arthur and in the Battle of the Sea of Japan. In 1912 Count Togo was made admiral of the Japanese fleet.

TOGOLAND, *to'go land*, a territory in West Africa, north of the Gulf of Guinea, in area about 34,000 square miles. Though moist and unhealthful in climate, Togoland is very productive, and yams, corn, bananas, ginger, tobacco and cocoa are extensively cultivated. The principal exports are palm oil, rubber, ivory and copra. The population is almost entirely black, with a few white residents. The colony was made a German protectorate in 1884, but was taken by British and French forces after a three-weeks' campaign in 1914. It was agreed at the peace conference of 1919 that Great Britain and France should make a joint recommendation to the League of Nations as to its future government.

TOKYO, or **TOKIO**, *to ke'o*, JAPAN, the capital and largest city of the empire, is situated in the east-central part of the island of Hondo, on the Bay of Tokyo and on both sides of the Sumida River, which divides it into two parts. The city has an area of thirty square miles and a population (1920) of 2,173,201, and is the sixth city of the world. In its newer streets, public utilities and buildings, Tokyo resembles a Western city. An excellent electric railway traverses the principal streets and an up-to-date water system furnishes an abundant supply of pure water taken from Lake Inokami, fifteen miles distant.

The imperial castle occupies the center of the city. The palace is a beautiful structure, in which are blended Japanese and European styles of architecture. The surrounding grounds form one of the most beautiful parks in Japan. Bordering the park are a number of government buildings of modern style of architecture. East of the palace is the business section, occupied by stores, warehouses, banks, newspaper offices and other commercial buildings. The principal business street extends through this section. Along the bay and both sides of the river are lowlands, through which extend many canals spanned by numerous bridges. The arsenal is sit-

uated in the northern part of the city and adjoins a garden noted for its rare beauty, and north of this is the imperial university, which is at the head of the Japanese system of education. Another structure of interest is the



TOKYO AND VICINITY

imperial museum, which contains many objects illustrating oriental art and history. The shrines which in the past were erected to former rulers are also among the most impressive and beautiful structures found within the city. These are usually adjoining one of the parks.

Tokyo has a well-organized fire department, a good police system, daily papers and such commercial arrangements as are found in the cities of Europe and America. Unfortunately the harbor is not deep enough to admit the largest ocean vessels, and this curtails its commerce to a considerable extent, but the manufactures are of importance and are increasing from year to year. The city is connected with Yokohama and other important towns of Hondo by railway.

The old name Yedo was given to a small village which was built at the head of the bay early in the fifteenth century. This became the site of a castle, and at the close of the sixteenth century the town was occupied by Ieyasu, who decided to make it the capital of the Empire. From that time its growth in size and influence was rapid, and it soon became the most important city in Japan. In

1868 the present name was adopted. The city was almost destroyed in September 1923, by a terrible earthquake, followed by fire and tidal waves. In Tokio, and neighboring cities more than 100,000 lives were lost. See TRAVELS IN DISTANT LANDS.

TOLE'DO, OHIO, third in size among the cities of the state, is the county seat of Lucas County, at the mouth of the Maumee River, 130 miles north of Columbus and 244 miles east of Chicago, on the New York Central, the Cincinnati, Chicago & Saint Louis, the Wabash, the Michigan Central, the Ohio Central, the Pere Marquette, the Grand Trunk and a number of other railways, in all seventeen lines, embracing over twenty divisions, either entering or passing through the city. The town is built on low land which slopes gradually from the river. The park system includes twelve large, and over forty small, parks, all having an area of 1,025 acres. The large parks are joined by a boulevard system twenty-five miles long. On the east side are Collins Park and Navarre Park.

Among the important buildings are the courthouse, located in an ample square, which contains a statue of President McKinley; a Masonic Temple; the public library, with a collection of over 70,000 volumes; the Newsboys' Building, a large number of fine business blocks, Saint Paul's and Saint Patrick's churches and Saint Francis de Sales School and Chapel. Among the educational institutions are Toledo Medical College, Snead School for Girls, Saint John's College and a number of denominational and private schools. The public school system includes a manual training school and a state normal school. An organization known as the Museum of Art maintains a gallery of paintings.

Toledo is an important industrial center, ranking next to Cleveland in importance in the state, with over 4,000 manufacturing establishments. Its leading industrial plants include blast furnaces, large plate glass works, the largest wagon factory in the world, the second largest automobile works in the United States, malleable iron works, flour mills, scale factories and establishments for the manufacture of cut glass, brushes, staves and the preparation of spices. The city has an extensive trade, especially in coal, in the shipment of which it takes rank among Great Lake ports. Its harbor contains twenty-five miles of docks.

The city is built upon ground formerly occupied by the Miami Indians. It was first settled in 1832, and was chartered as a city five years later. With the settlement of the states in the Mississippi valley, the town began a steady and prosperous growth. Population, 1910, 168,497; in 1920, 243,109, a gain of 44 per cent.

TOLL, *tole*, a tax paid, or duty imposed, for some privilege. Formerly it was the custom in the United States and Canada for travelers over country roads to pay tolls. Gates were placed across the road at regular intervals, and each person was required to pay a toll before the gate was opened and he was permitted to pass. The charge varied, a man driving a team paying more than the horseback rider. The revenue from the tolls was used to pay for road repairs. Tolls were also charged on bridges. Toll gates are still found in certain rural districts of Europe. On some of the canals of international importance, such as the Suez and the Panama, ships are required to pay moderate tolls. The tax is used to defray the cost of maintenance and pay interest on the money borrowed for the building.

TOLSTOI, *tahl'stoi*, LYOFF NIKOLAYEVITCH, Count (1828-1910), the foremost of Russian novelists and one of the most profound thinkers of his age, who felt as have few other men the burden of human woe. He was born at Yasnaya Polyana, of a wealthy and noble family. After his graduation from the University of Kazan, where he pursued one branch of study after another in a vain effort to find his calling, he joined the army and saw fighting on the western border. In the course of this pe-



LYOFF TOLSTOI

riod he wrote *Childhood*, his first published story, and *Boyhood*, both of which show the author's developing doctrine of nature as the guide of life. Reminiscences of his part in the Crimean campaign were published as *Tales of Sebastopol*—stories in which are pictured with dreary realism the horrors of war, the mockery of military glory.

Of the many social evils in the Russia of his day which cried loudly for reform, there was

none to which Tolstoi gave more sympathetic heed than the oppression of the serfs. He visited England, France and Germany to observe the condition of the laborers in those countries, and on his return to Russia in 1861 freed all his slaves and opened a school for the peasant children on his estate, teaching them himself until the institution was closed by the government. His sorrow over the tyranny and injustice he saw everywhere about him found vent at this time in two of his bitterest stories, *Three Deaths* and *The Cossacks*. A still more powerful arraignment of society was *War and Peace*, published in 1869. This extraordinary prose epic, showing the contrast between the artificial life of the upper classes and the wretched lot of the common people, stands as one of the supreme achievements of nineteenth-century literature. *Anna Karenina*, a novel dealing with the problem of personal liberty and interdependence, is scarcely less remarkable.

From this time philosophical and social problems occupied Tolstoi almost exclusively. *The Death of Ivan Ilyitch* and *The Power of Darkness* express forcibly his growing concern for the welfare of his fellow men and his sympathy with their sufferings. Gradually he dispensed with the comforts to which his inheritance entitled him and began living the simple life of the peasants, working all day in the fields or at the cobbling bench. No man ever exemplified more nobly the dignity of manual labor, the emptiness of worldly ideals, the worthlessness of property as a personal asset. But for his family he would have given everything he had to the poor. In the few leisure hours of his later years he wrote *The Kreutzer Sonata*, *The Resurrection* and *Master and Man*. Unsatisfied from the first with the doctrines in which he had been brought up, and seeking always for religious truth, Tolstoi arrived at a form of faith of which he made open declaration in *My Confession* and *My Religion*. Because of his radical views he was excommunicated by the Greek Catholic Church in 1901. Towards close of his life Tolstoi addressed to the czar letters advocating representative assemblies of the people, universal suffrage and other reforms. Among his writings is a remarkable prophecy which foretold with startling accuracy the outbreak and extent of the World War.

TOM'AHAWK, a war club or hatchet used by the North American Indians. The first

tomahawks were made by fastening a rock or deer horn to a wooden handle by means of hide thongs. From the early white settlers the red man learned to make hatchets on the European model, with metal heads. Tomahawks were used either in close combat or were thrown so as to strike with the edge. The early colonial writers made it a symbol of war, and from this fact arose the expression *bury the hatchet*.

TOMA'TO, a plant belonging to the nightshade family, same family as the potato and the egg plant. It is a native to the Andes region of South America and has been introduced into most warm or temperate countries. It is cultivated for its fruit, which is fleshy, usually scarlet or orange in color and irregular in shape. Tomatoes are eaten raw, are used as ingredients in salads, or are stewed and cooked in various other ways.

For a long time after it was brought from Peru, the tomato was known as the *love apple*, and was considered poisonous; in fact, it was not until the early part of the nineteenth century that its value as an article of food was realized. The yearly crop in the United States is very large, and the annual output of the canned stock is larger than that of any other fruit. Maryland ranks first in production, with New Jersey, California, Delaware and Virginia as close rivals. Large crops are also produced in Canada.

TOMB, a burial vault, either below or above ground. Among the most civilized of ancient peoples the tomb had an important place. The royal tombs known as the Pyramids (which see) and the many-chambered rock-hewn tombs that sprinkle the Nile valley are among the most important monuments that have come down from the early Egyptians. The Jews buried their dead in sepulchers hewn out of solid rock, and it was in one of these, belonging to Joseph of Arimathea, that Christ was laid. The Greeks, too, used this kind of tomb and also built burial vaults above ground, the colonists of Asia Minor erecting the most elaborate, notably the tomb of Mausoleus, in Caria, from which the word *mausoleum* is derived. In general, the Romans paid more attention to places for the repose of their dead than did the Greeks. The chief road entering Rome, the Appian Way, was lined with tombs; the most notable of these was the Emperor Hadrian's. Elsewhere in Italy tombs were built in the city streets. At one time there it was customary

to build underground chambers with wall niches to receive the bodies of families or communities. The catacombs, the underground crypts in which the early Christians interred their dead, may be regarded as a form of tomb.

In medieval times it became customary among Christians to bury their dead in churches, the stone coffin or sarcophagus being used for this purpose. Beautiful tombs are not numerous in the Orient, and yet the most exquisite building in Asia, perhaps in the world, is the Taj Mahal, the sepulchre of the Shah Jehan and his favorite wife, at Agra, India. At the present time it is not customary to erect elaborate tombs, either to members of one's family or to great men. A conspicuous exception in the United States was the building, in New York City, of a magnificent tomb to the memory of Ulysses S. Grant.

TOMBIG'BEE, a river which rises in the northeastern part of Mississippi, flows south, then southeast into Alabama and continues in this direction until it unites with the Alabama to form the Mobile River. The length is 450 miles, and it is navigable for steamboats to Aberdeen, Miss. The chief tributary is the Black Warrior.

TOMP'KINS, DANIEL D. (1774-1825), an American statesman, Vice-President of the United States, born at Scarsdale, N. Y. He was educated at Columbia College, studied law, was admitted to the bar in 1797, and in 1804 was appointed a judge of the state supreme court. Three years later he was elected governor and served ten years. He was bitterly opposed to the chartering of the Bank of America in New York, in a long contest in which corruption played an important part against him, and he took the unparalleled step of proroguing the legislature to prevent it, but without success. He persistently advocated the abolition of slavery, which was accomplished in New York, largely through his efforts, in 1827. From 1817 to 1825 he was Vice-President of the United States.

TOM'TIT. See TITMOUSE.

TON, *tun*, a measure of weight in the English system, equivalent to twenty hundredweight. A standard hundredweight in both England and America is equal to 112 pounds; hence the standard ton in large commercial transactions is equal to 2,240 pounds. In America, however, the so-called *short ton*, of

2,000 pounds, is commonly used, the hundredweight being reckoned at 100 pounds, although Congress has legislated that unless otherwise specified a ton weight is to be 2,240 pounds avoirdupois. Coal is bought by dealers by the *long ton* of 2,240 pounds and is sold to the consumer by the *short ton*.

TONE, in music, the sound produced by the vibration of a musical instrument or by the human voice (see SOUND; MUSIC). Nearly every musical sound is composite; that is, consists of several simultaneous tones, with different rates of vibration, according to fixed laws, which depend on the nature of the vibrating body and the mode of producing its vibrations. These several tones are called *partial tones*. The one having the lowest rate of vibration and the loudest sound is termed the *prime, principal, or fundamental, tone*; the other partial tones are called *harmonics, or overtones*. See HARMONICS.

TON'GA ISLANDS, or **FRIEND'LY ISLANDS**, a cluster of Polynesian islands in the South Pacific Ocean. The archipelago, comprising 150 islands, consists of three groups, which are divided from one another by two narrow channels. Of the islands, only Tongatabu, the largest, Vavau, and Eua are of any importance. The main islands are covered with rich vegetation, and the soil is very fertile. Copra and fungus are exported, and the making of tapa and mats constitutes the chief industry.

The main group of islands was discovered in 1643, by Tasman, and since 1900 a protectorate has been proclaimed over them by Great Britain, although they are ruled by a native king who resides at Nukualofa, in Tongatabu, which is the capital of the kingdom. Population 1911, 23,900, of whom 308 were Europeans.

TON'IC, in medicine, any remedy which improves the tone or vigor of the fibres of the stomach and bowels or of the muscular fibers generally. Tonics may be said to be of two kinds, medical and non-medical. *Medical tonics* act chiefly in two ways: (1) indirectly, by first influencing the stomach and increasing its digestive powers, this being the effect of such vegetable bitters as chamomile, cinchona bark, gentian and taraxacum; (2) directly, by passing into and exerting their influence through the blood, as is the case with various preparations of iron, certain mineral acids and salts. The *non-medical tonics* are open air, exercise, friction, cold, in

such forms as the shower bath and cold sponge bath.

TONGKING', or **TONQUIN'**, a French protectorate in French Indo-China, bordering on the Gulf of Tongking, an arm of the China Sea. The territory is drained by the Red River and has an area of 46,000 square miles. Its population exceeds 6,000,000, of whom 6,000 are Europeans. Its chief cities are Hanoi, the capital of French Indo-China, and Haiphong, the principal port. The leading product is rice, though corn, sugar cane, cotton, coffee, fruits and tobacco are also raised, and there is an important silk industry. Exports are rice, maize, animal products and raw silk. Roman Catholicism has an extensive hold on the people, who are mainly Annamese in race. Tongking was an independent state until 1882, when it came under the control of Annam. The French began military operations on the coast in 1873, facing opposition from both Annam and China until the territory was finally annexed to France in 1884.

TONGUE, *tung*, the muscular organ of the mouth; also, the principal organ of taste. The tongue is attached at its back extremity to the *hyoid* bone and its opposite end is free to move in all directions. The interior is composed entirely of muscles, whose fibers extend in nearly all directions and are so arranged as to be mutually helpful. By them the tongue can be flattened, made to assume nearly a cylindrical form, protruded from the mouth or directed to any part of the mouth in which food may lodge. Another set of muscles, the *extrinsic*, joins the tongue to opposite supports and causes it to move. The exterior is covered with a mucous membrane, or epithelium, in which are the papillae containing the end organs of the nerve of taste. The back part of the tongue contains a number of glands which secrete mucus, to keep it moist. Besides being the principal organ of taste and articulate speech, the tongue performs an important function in mastication and in swallowing. See TASTE.

TONNAGE, *tun'naje*, the number of tons' weight which constitutes a ship's carrying capacity with safety. This is known as *dead weight tonnage*. Ordinary, or *gross, tonnage* is not strictly the measure of a ship's carrying weight, but a gauge of the vessel's dimensions, more or less accurate. The interior capacity of the hull of a ship and its deck houses are divided by 100, on the sup-

position that 100 cubic feet space will hold a ton. In freight ships, forty cubic feet of merchandise is considered a ton; however, when the weight exceeds 2,000 pounds, or 2,240 pounds, as the custom may be, payment is made by weight. Each of the great ship canals of the world has an individual tonnage measurement upon which the exaction of tolls is based. See SHIP.

TON'SILS, *THE*, two oblong, soft bodies, situated on the sides of the throat, and made up of minute glands, which give out a secretion that helps the food to pass them. During a cold or a sore throat, they are often enlarged, and when permanently enlarged they may be removed without danger. Physicians recommend this slight operation.

TONSILLITIS, *tahn si l'itis*, inflammation of the tonsils. Tonsillitis is rare in infancy or in old age, persons between the ages of ten and forty being most susceptible to it. The inflammation, though seldom fatal, is very painful. The tonsils sometimes become ulcerated, and large accumulations of pus are common. When this last condition occurs the disease is known as quinsy. The causes of the various forms of tonsillitis are not definitely known. The commonest causes are severe colds, which cause a slight inflammation of the tonsils and render them susceptible to other germs. Enlarged or inflamed tonsils should never be exposed to the contagious diseases. An attack of tonsillitis ordinarily lasts five or six days. The first symptom may be a slight chill; then comes a swelling and pain in the throat, with difficulty in swallowing and in breathing. Rest in bed, hot compresses on the neck, purgatives and an abundance of soft or liquid food are important points in the treatment. The most trustworthy medicines are iron and quinine. See QUINSY.

TONSURE, *tahn'shure*, a religious ceremony in the Roman Catholic or Oriental churches whereby an individual cuts or shaves his hair to denote his dedication to a clerical or monastic life. Clerical tonsure was mentioned in the fifth century, but the practice was not universally adopted until the Middle Ages, when various modes became prevalent. The *tonsure of Peter*, that of the Roman Church, consisted in shaving the crown as well as the back of the head, leaving a circular ring of hair around the head; the *tonsure of James* consisted in shaving the front part of the head from ear to ear.

TONTY, or **TONTI**, *tohN'tee*, HENRI DE (about 1650—about 1704), the trusted companion of the explorer La Salle. He was born in Italy, but early entered the army of France, and in July, 1678, accompanied La Salle to Quebec. He assisted in preparing for several of La Salle's great exploring expeditions, and was left by La Salle in March, 1680, in charge of Fort Crevecoeur, near Peoria, Ill. Tonty was forced to abandon the position because of mutiny and the hostility of Indians, and returned to Green Bay. Later he joined La Salle at Michilimackinac (Mackinac Island), accompanied him in his voyage down the Mississippi, and was placed in command of Fort Saint Louis, at Starved Rock, near the present village of Utica, Ill. He continued to live among the Illinois Indians until 1702, exerting a beneficial and strong influence over them.

TOOMBS, *toomz*, ROBERT (1810—1885), an American statesman, lawyer and soldier, born at Washington, Ga. He began the practice of law in 1830. In 1827 he was elected to the state legislature, where, except during 1841, he served until 1845. He then became a member of the House of Representatives for four terms. In 1853 he was elected to the Senate. He opposed the Mexican War and the consequent acquisition of territory by



ROBERT TOOMBS

conquest; but largely through his influence, in 1861, Georgia passed its ordinance of secession, and he then withdrew from the Senate. He was a delegate to the Confederate congress at Montgomery and subsequently was Secretary of State in the Confederacy. He resigned this office soon after, to take a commission, and as brigadier-general distinguished himself at Antietam and in the second Battle of Bull Run. At the close of the war he resumed law practice in his native town.

TOP, one of the most popular of children's toys, interesting because it can be made to spin upright on its axis with a velocity and in a manner depending on the skill with which it is handled. In its simplest form it is a solid cone-shaped piece of wood with a metal peg

at the pointed end and a knob or handle at the opposite end. The spinning is accomplished by means of a cord, which is wound from the peg and upward. A wooden button on the free end of the cord is held between the fingers; the top is tossed to the ground and the string jerked back, starting the top to spinning as it rapidly unwinds.

The toy factories have produced many beautiful and interesting playthings which are modifications of this form. One of these is a large, hollow tin top, with projecting axis at the top, around which the cord is to be wound. Another similar to this has holes in the side, through which the air passes and causes a singing note as the top spins. Still another is decorated with colored designs, which in motion result in strange optical illusions. Some of the mechanical tops can be wound up to run an hour; others are music boxes which play tunes.

TO'PAZ, a mineral, ranked among the gems. It varies from transparent to translucent, has a clear luster and may be yellow, white, green or blue in color. It is harder than quartz and is nearly four times as heavy as water. Chemically, it is a silicate of aluminum, in which the oxygen is partly replaced by fluorine. It occurs in masses and is crystallized in prisms. Crystalline topazes are found generally in igneous and metamorphic rocks and in many parts of the world. Various localities in Maine, Colorado and Utah supply them, and they are common in parts of India and in Brazil. The Brazilian topazes have deep yellow tints; the Siberian topazes and those found in the Scotch Highlands are bluish. In ancient times the topaz was a symbol of friendship and was thought to drive away sadness and bestow courage. It is the birthstone for November.

TOPEKA, *toh pe'kah*, KAN., the capital of the state and the county seat of Shawnee County, sixty-six miles west of Kansas City on the Kansas River and on the Atchison, Topeka and Santa Fé, the Chicago, Rock Island and Pacific, the Missouri Pacific and the Union Pacific railroads. The city is situated on rolling prairie land, at an elevation of about 900 feet, and covers an area of seven square miles. It is laid out with broad, well-shaded streets, and has several attractive parks.

The most notable buildings near the center of the city are the state capitol, the Kansas Memorial building, and the Federal build-

ing. Other important structures are the court house, the city hall, the Y. M. C. A., the Y. W. C. A., the Mills building. The state hospital for the insane occupies five large buildings on extensive grounds west of the city, and the state industrial school for boys has accommodations for two hundred boys on a farm of 210 acres north of the city. Topeka is the seat of Washburn College (Congregational), of the College of the Sisters of Bethany (Episcopal), of the Kansas Medical College, and of several business colleges. The libraries of the city are the free public library in a beautiful building on the state grounds, a large state library and that of the state historical society, the latter two in the state capitol.

Industrial establishments include the railroad shops of the Atchison, Topeka & Santa Fé Railroad, extensive exporting flour mills, foundries, brickyards, machine shops, packing houses, creameries, starch works and manufactories of furniture and clothing. Three fine hospitals, besides that of the Santa Fé railway, are located here. The place was settled as one of the free state towns in 1854, and became notable for its feuds between the anti-slavery and pro-slavery elements. It was chartered as a city in 1857, and was selected as the state capital in 1861. It adopted the commission form of government in 1909. Population, 1910, 43,684; in 1920, 50,022, a gain of 15 per cent.

TORNA'DO, a revolving storm that has great force. The term was originally applied to the hurricanes prevalent in the West Indies and on the west coast of Africa and in the Indian Ocean, but more recently it has been extended to apply to other storms. In the United States the tornado is frequently, though incorrectly, termed a cyclone.

Characteristics. Tornadoes, usually form within thunder storms and are caused by conditions similar to those which produce whirlwinds (see WHIRLWIND). They occur on warm days, when there is great humidity.

The tornado cloud has a funnel-shaped vortex, in which the velocity of the whirling motion increases as it approaches the center, where it becomes so great as to destroy all objects within the path of the tornado. The direction of the whirl is contrary to that of the hands of a watch, and the tornado moves from southwest to northeast, with a velocity varying from twenty-five to forty miles an hour. The danger lies in the path of the

funnel-shaped cloud which is usually but a few rods in diameter. Near the vortex the velocity of the wind is such as to overthrow and often destroy small structures and to draw light objects within the vortex.

Many theories have been advanced to account for these destructive storms, but none seems perfectly satisfactory. The conditions favorable to the development of a tornado are a warm layer of excessively humid air next to the earth, and a layer of cool air above. When an upward current is once started in the warm air, a rotary motion is immediately produced by the inrush of cold air from above. This rapid rotation causes a small area of very low pressure, and the force of the upward current soon increases to a degree that enables it to bear aloft all objects with which it comes in contact. In the center of the vortex the pressure is so light that buildings within the path of the tornado are often wrecked by the expansion of the air within.

The condensation begins in the upper air, where the temperature is lowest, and as the whirling column continues to cool by expansion of the rising air, the point at which the condensation takes place gradually approaches the earth, and the cloud continues to form lower and lower, until it comes in contact with the ground. The extension of the column downward is not due to the lowering of the cloud, as frequently supposed, but to the descent towards the ground of the point of condensation.

While no portion of the United States east of the Great Plains seems free from these storms, they are most frequent in the Mississippi Basin, occurring in the south in the early spring and gradually traveling northward, until in midsummer they occur as far north as Minnesota and North Dakota. See CYCLONE; HURRICANE; TYPHOON.

TORONTO, *toh rahn'toh*, ONT., the capital and largest city of the province, and the second largest in Canada, ranking next to Montreal. It is situated on the northwest shore of Lake Ontario, 334 miles southwest of Montreal and forty-one miles north of the mouth of the Niagara River. Two main railways enter the city—the Canadian Pacific and the Canadian National—and it is visited by many of the steamers plying the Great Lakes.

General Description. The city has a charming location on ground rising gradually until it reaches an altitude of 200 feet in

the highest part. On the hills are beautiful homes, fronting broad streets lined with fine shade trees. The spacious harbor is protected by a low, sandy island that extends for about three miles. In the summer time the harbor is dotted with canoes, launches and sailboats. The whole harbor front is being improved in accordance with plans involving the expenditure of millions of dollars. A thousand acres of waste land is being reclaimed, and the site is to be used for commercial and industrial purposes. A five-million-dollar Union Station was in process of construction in 1919; other improvements include the building of sea walls and docks and the making of a boulevard and park system along the lake front.

Parks and Buildings. Among the many beautiful parked areas of Toronto the largest are High Park (335 acres), Exhibition Park (235), Humboldt Boulevard (129) and Riverdale Park (108), the latter possessing a fine zoölogical garden. In Exhibition Park are held annual exhibits showing progress along agricultural, industrial and art lines. The buildings housing these exhibits are permanent, fireproof structures. Toronto residents patronize two pleasure parks—Hanlon's Point, on the harbor island, and Scarborough Beach.

The city hall, shown in the accompanying illustration, is the most pretentious of the public buildings. In its tower is the largest winding clock on the continent. The edifice was eight years in building, and cost about \$2,500,000. The cornerstone was laid in 1891. In Queen's Park, which is situated about a mile from the water front, is the imposing building of the provincial parliament. Other notable structures include the Royal Bank, the Bank of Toronto, the General Hospital, the Arena Auditorium, the buildings of the Canadian Pacific Railway and the public library. Toronto has a large number of fine churches, among which are Saint James Cathedral, with a spire 316 feet high, the Metropolitan Methodist Church, the Cathedral of Saint Michael, Saint Andrew's, the Jarvis Street Baptist and the Bond Street Congregational churches.

Education. The city is the foremost educational center of Canada. The University of Toronto, housed in a group of artistic buildings in Queen's Park, is the largest institution of higher learning in the Dominion. Other notable schools are McMaster

University (Baptist), Trinity College (Anglican), Upper Canada College, Saint Andrew's College, and the technical school, one of the best equipped schools of its kind in the world.



TORONTO CITY HALL

Art and musical schools of high standard are also maintained, and the city supports two musical enterprises of considerable fame, the Mendelssohn Choir and the symphony Orchestra. The splendid public school system is managed by a board of education elected by popular vote.

Industry and Commerce. About one-eighth of all the articles manufactured in the Dominion are produced in Toronto, whose industrial establishments have an output whose combined value is about \$250,000,000 a year. The city is the leading Canadian center for slaughtering and meat packing, and it produces large quantities of lumber, musical instruments, clothing, wall paper, machinery and iron and steel goods. Among Canadian cities Montreal alone has a larger volume of banking business; Toronto is first in the exchange of livestock, grain and fruits, and as a wholesale jobbing center. In the city is the largest department store in the British Empire.

History. The city was founded in 1794, under the name of York, but was destroyed by the Americans in 1813. In 1834 it was incorporated under the present name. It suf-

ferred from the rebellion led by William Lyon Mackenzie in 1837 and from a fire in 1849. Since that time it has been remarkably prosperous. Population, 1911, 376,538; in 1921, 521,893.

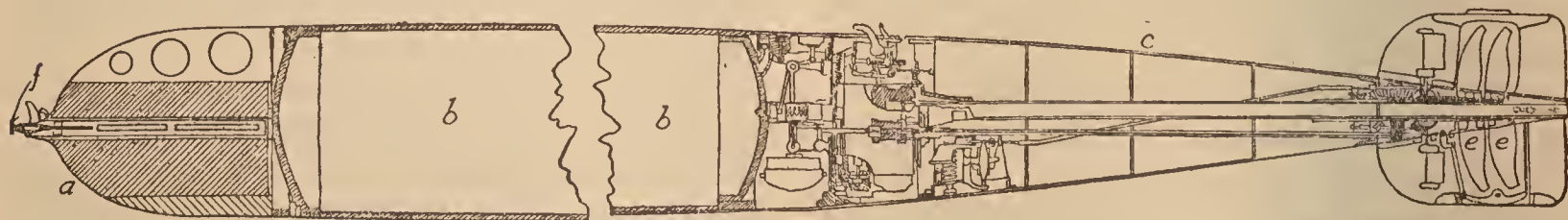
TORONTO, UNIVERSITY OF, an institution at the head of the school system of Ontario, chartered in 1807, under the name of the University of King's College. The further organization, however, was delayed, and the university was not opened until 1843. Six years later, the name was changed to the University of Toronto. The institution has undergone several reorganizations. It now includes faculties of arts, law, medicine and applied science and engineering, and it has instituted courses and examinations for degrees in agriculture, dentistry, music, pedagogy, pharmacy and household science. There are also a number of colleges and schools throughout the province affiliated with the university, and extension work is maintained by a special committee. Women are admitted. The management of the university is similar to that of the English universities. There is a student body of about 4,000, and a faculty of 400. The library contains 150,000 bound volumes and there are also about 50,000 pamphlets.

TORPE'DO, a death-dealing device which is propelled through water with a great ship as its target and intended victim. During the great war of 1914-1918, the torpedo became one of the most terrifying weapons used upon the seas. The modern or White-head torpedo is one of the most ingeniously devised instruments ever invented for the purpose of destroying ships and human life. It consists of a cigar-shaped steel shell from eighteen to twenty inches in diameter and

of 2,500 pounds to the square inch; and the after body, *c*, which contains the machinery for propelling the torpedo. The propellers, *e, e*, resemble those used on small motor boats. They are operated by the compressed air. The engine may be of the crank and piston type, or it may be on the plan of the steam turbine. A gyroscope (which see) holds the torpedo to its course, but there is now an invention of John Hayes Hammond, Jr., which makes it possible to direct the course of a torpedo by electricity, from the shore or from a vessel. Successful experiments have been made.

Projecting from the head is the war nose, which discharges the explosive when it strikes the ship. The charge usually consists of about 250 pounds of moist guncotton or an equivalent quantity of T. N. T. This charge has an explosive force of sufficient strength to shatter the bottom or the side of the strongest warship. A complete torpedo of the largest size costs fully \$8,000. Torpedoes used in target practice contain no explosive, and are recovered and used over and over again. A torpedo of the most powerful type can travel about six miles at a speed of about thirty miles an hour before its power is exhausted. If it is adjusted for a shorter distance its speed may be increased to forty miles an hour. Submarines seldom fire at a ship more than a mile distant, and then the chances are that the torpedo will miss its mark. When the ship is within 700 to 1,000 yards there is a fair chance of scoring a hit. The torpedo may be fired from above or beneath the surface of the water, but, since the perfection of the submarine firing from above the water has practically been abandoned.

History. The first torpedo that can be considered a forerunner of the present type was



(a) Head; (b) air cylinder; (c) after body; (e) propellers; (f) war nose.

from seventeen to twenty-two feet long. It has a conical-shaped head, and towards the rear it tapers to a narrow cylindrical tail to which the propellers are attached.

The entire shell is divided into three chambers—the head, *a*, which contains the charge of explosive; the air cylinder, *b*, which contains compressed air, often under pressure

invented by David Bushnell, an American. To become effective, Bushnell's torpedo had to be attached to the ship, and this called for a sort of submarine boat, just large enough for one man, who descended and attached the torpedo to the bottom of the ship and then got as far away as possible before it exploded. Bushnell's torpedo was not found practical.

In 1585 an Italian destroyed a bridge on the Scheldt, by sending a boat charged with gunpowder down the river. The charge was fired by means of clockwork. A century and a half later, a Frenchman exploded some rockets under water and destroyed some small boats. While numerous experiments were made in the next hundred years, the torpedo was not brought to practical use until the American Civil War, when it became a very powerful and dangerous weapon.

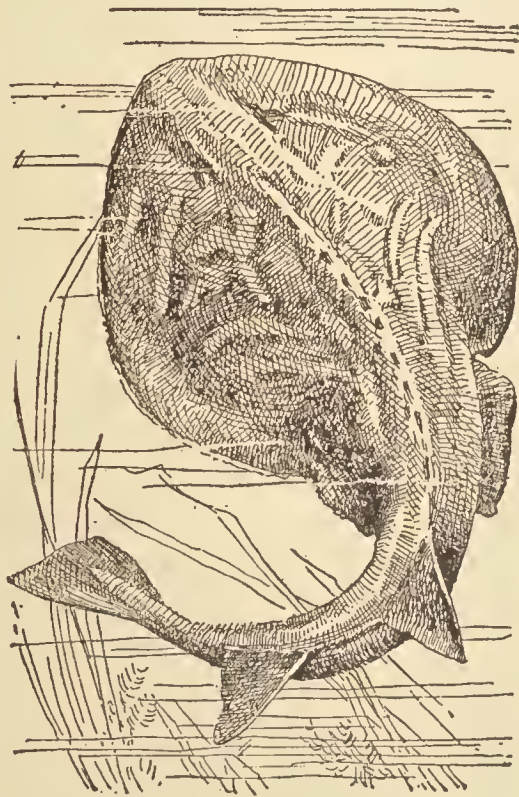
The first torpedoes intended to be projected through the water were shot from a gun like a shell. If the target was more than a quarter of a mile distant it could not be reached. This torpedo required a light, swift boat that could approach close to its target, fire its shot, and get away quickly. It was this requirement that brought the torpedo boat of the last quarter of the nineteenth century into existence. From this torpedo that of the Whitehead type was developed and brought to a high degree of perfection during the World War.

Related Articles. Consult the following titles for additional information:

Guncotton
Gyroscope

Submarine
Torpedo Boat

TORPEDO, or **ELECTRIC RAY**, a large, flat fish of the ray family, which inhabits the warm waters of all seas. It is remarkable chiefly for a set of organs in the head in which electricity is generated. The broad, flat body ends in a comparatively slender tail. The power of the electrical discharge varies with the health and size of the fish. The shock of a full-grown torpedo



TORPEDO

(which may weigh from 50 to 250 pounds) is sufficient to disable a man; that of the smaller specimens is used effectively in capturing prey. After a shock the electricity

is exhausted, and time and food are needed to supply a fresh storage.

TORPEDO BOAT, a comparatively small boat equipped for shooting torpedoes. The object of the torpedo boat is to approach other ships stealthily, and to project the torpedoes in the direction of the enemy, then steal swiftly away. The development of the submarine (which see), and the consequent change of methods in shooting torpedoes, has rendered the torpedo boat of less value than it formerly possessed.

Torpedo Boat Destroyer. The havoc wrought by torpedoes fired from torpedo boats led to the construction of a boat especially adapted for warfare against the latter. Torpedo boat destroyers were merely torpedo boats of large size and high speed, fitted to withstand any weather and to meet torpedo boats at an advantage. The armor was heavy and the offensive armament was strong. The destroyers were equipped like torpedo boats, and so at times they took the place of the latter; in fact, a combination of the two was not an uncommon thing in navies. In the World War submarines supplanted the old-type torpedo boats and destroyers, and allied fleets of swift vessels armed with guns and depth charges were employed successfully in clearing the seas of the deadly underseas craft.

TORQUEMADA, *tor ka mah'da*, THOMAS DE (1420-1498), a Spanish inquisitor-general, born at Valladolid. He was head of the Inquisition for fifteen years, and in the course of that time sentenced to death more than 10,000 anti-Catholics and expelled the Jews and Moors from Spain. He believed that the stability of Spain depended on religious unity, and he suppressed heresy as a patriotic and religious duty. His cruelties made him intensely unpopular with the people and were so severe the Pope found it necessary to interfere.

TORRENS SYSTEM, a system of registering titles to real estate, introduced into Australia by Sir Robert R. Torrens in 1857. The purpose of the system is, first, to make the transfer of real estate as simple and safe as the transfer of personal property; second, to do away with the old cumbersome system which requires an examination of the title every time a transfer of the property is made.

How to Get the First Torrens Title. The owner of land desiring a Torrens title should

file with the registrar a petition for registration. With the petition he must file all records in his possession pertaining to the title, and also give in writing, under oath, a statement of all incumbrances (debts) on the property. If other persons are interested in the property by marriage or otherwise the registrar notifies them of the petition and gives them opportunity to be heard. The petition, all records pertaining to the title and any objections raised are placed in the hands of the examiner of titles. If he finds the facts to be as stated by the petitioner, he files the old papers and issues a certificate of ownership. The certificate is issued in duplicate, the original being kept in the office of the registrar, and the duplicate given to the owner.

How to Transfer a Title. When real property is sold under the Torrens system, the first certificate is cancelled and a new one issued, and this completes the transaction. No examination of title is necessary, for the first certificate is *indefeasible*, that is, it cannot be set aside. Should any claims arise against the property they cannot affect the title, nor will the original owner have to pay them. They are paid by the state from a fund created for that purpose, by charging a slight tax on the property registered. This tax seldom exceeds one-tenth of one per cent, and it has been found ample for meeting all claims.

Extent of Use. The Torrens system was introduced into South Australia in 1857, and was soon adopted by the other Australian states and by New Zealand. It has been adopted in England and a number of countries on the continent of Europe. It is in general use in the northwest provinces of Canada, and to a limited extent in the maritime provinces. Illinois was the first state of the United States to adopt the system. In 1919 it was in use in ten other states, and in Hawaii and the Philippine Islands.

TORRICELLI, *tor re chel' le*, EVANGELISTA (1608-1647), an Italian mathematician and physicist. Torricelli's name is important in the history of science as the discoverer of the law on which the barometer depends. The principle of this law is that the pressure of the atmosphere sustains a column of mercury of equal area and of the same weight as the column of atmosphere. See BAROMETER.

TOR'RINGTON, CONN., in Litchfield County, twenty-six miles west of Hartford,

on the Naugatuck River and on the New York, New Haven & Hartford Railroad. It is an industrial center, producing bicycles, ice skates and roller skates, woolens, brass articles, novelties, needles, hardware and tobacco goods. The municipality has a public library, a fine city hall and a Y. M. C. A. The place was settled early in the eighteenth century and was chartered as a borough in 1887. John Brown was born here in 1800. Population, 1910, 15,483; in 1920, 22,055 (Federal census). Torrington has had the largest percentage of increase in population of any city in Connecticut since 1910.

TORSION, *tor'shun*, **BAL'ANCE**, an instrument employed to measure the intensities of very small forces. Its essential parts are a fine horizontal bar suspended by a thread of silk or other substance and a graduated scale to which the thread is attached. The rotation of the bar determines and registers (with the aid of a mirror beneath) the intensity of the force acting on it. The name of the instrument has reference to the torsion (twisting) of the thread with the movement of the horizontal bar acted on by the force to be measured. See GALVANOMETER.

TORT, a civil wrong for which the law requires compensation in damages. The right to damages for a tort arises not necessarily from breach of contract, as a tort may be committed where no contract has existed. Thus nuisance, libel and slander, trespass and injuries to property are torts. The same act may be both a tort and a crime. Thus a man may be prosecuted by the state for assault and battery and at the same time may have brought against him by the injured man an action for damages.

TORTOISE, *tor'tis*, or *tor'tus*, a member of a group of reptiles belonging to the same family as the turtles, but living on land either partially or exclusively. Unlike the turtles tortoises have highly-arched shells, or carapaces, and the hind feet are club-shaped. Of the three well-defined species in the United States the most important is the *gopher* tortoise, found in the Southern states. It averages about nine pounds in weight, and the carapace is about eleven by eight inches. In the islands of the Southern Pacific giant tortoises were once numerous, but they are now nearly extinct. A few specimens are preserved in zoölogical gardens. Some have been known to live more than 150 years. See TURTLE.

TORTOISE SHELL, a name popularly applied to the horny plates of certain turtles. The designation is not accurate, as the tortoise is a land turtle, whereas tortoise shell is a product of the hawksbill turtle, which inhabits tropical seas. The carapace of this animal is composed of layer upon layer of horny plates. To detach these it is necessary to immerse the shell in boiling water. The layers are very thin when removed, and for commercial purposes must be welded together. The welding is done by boiling the scales in water and then subjecting them to heavy pressure. After this the slabs of shell can be shaped into combs, eye-glass rims, card cases and the numerous toilet articles for which tortoise shell is in demand. The material has been used at various times for inlay work.

TOR'TURE, the infliction of severe bodily pain, for punishment, for revenge or to force a confession from the individual so mistreated. It was customary for primitive people, including the American Indians, to inflict cruelties upon their captives. In the Middle Ages throughout Europe torture was commonly resorted to, especially by the Church to enforce religious conformity and to extort evidence in heresy trials; John Huss and Savonarola were victims of such proceedings.

Although the cruelties of the custom were recognized and its application deplored, the practice continued in many parts of Europe until the early part of the nineteenth century; even up to 1917, the year of the revolution in Russia, exiles to Siberia were flogged unmercifully. The devices and methods of torture were as varied as they were unspeakably cruel. See ORDEAL.

TORY, *toh'ri*, a political party name, used in England and other Anglo-Saxon countries, is of Irish origin, having first been applied to the Irish loyalists who fought for King Charles I. At one time any sort of an Irish outlaw was called a Tory. The term was first used in English politics in 1679, being applied in derision to the Roman Catholic opponents of the bill excluding the Duke of York (James II) from the throne. Thus it came to be identified with the court party, their opponents being classified as *Whigs*. Although *Tory* was in the beginning almost synonymous with Catholicism, it lost all sectarian implication when the British Crown became Protestant, but continued to

be identified with the royal party. In America in Revolutionary times the term was applied to all adherents of England. With the decline of Toryism in England the adherents of the doctrines gradually merged with the Conservatives, but the name is still in use.

TO'TEM, among some primitive peoples an object regained as a symbol of a tribe, family, or individual. It is usually a representation of an animal. Those who have the



TOTEM POLES

same totem are regarded as bound by closer ties than any other persons. The North American Indians commonly carve their totems on poles. The Indians of Western Canada often carve theirs on the trunks of cedar trees.

TOUCAN, *too'kan*, a bird found only in



TOUCAN

tropical or semi-tropical America, remarkable for the size of its bill, which at the base is

as large as the rest of the head. The upper mandible is curved downward sharply at the tip and is toothed like a saw at the edges. The birds, however, handle this great beak very skilfully upon the soft fruits which constitute their food. The toucans live in trees, usually in flocks, over which one acts as watchman. Like most tropical birds, nearly all of them have showy plumage, with bright patches of yellow, orange, blue or red on a ground shade of green or black. The bills also are brightly colored in some species.

TOUCH, *tuch*. The sense of touch has its seat in the sensory nerves of the skin and the mucous membrane of the mouth and in their respective centers in the brain. The sense is most fully developed in the forehead, the face, the tip of the tongue, the fingers and palms of the hands, and the toes and soles of the feet, where sensory nerve filaments are more numerous and also have their extremities more fully developed than in other parts of the body. The ends of these nerves are known as *tactile corpuscles* and are best illustrated by those of the fingers. The ridges on the tips of the fingers and palms of the hands are made up of rows of conical papillae, most of which contain a highly developed end organ from the sensory nerve. These nerve filaments are stimulated by contact of the papillae with external objects, and the impulses are interpreted by the sensory centers in the brain (see NERVOUS SYSTEM, subhead *Sensory Nerves*).

Measured by the pressure required to be recognized, the sense of touch is keenest in the forehead, but measured by the power of conveying different impressions, the organs of the fingers are the most perfect. In the blind and deaf the sense of touch becomes highly developed. By many authorities touch is considered the fundamental sense. We know it is the first of the special senses to be developed, and there is good evidence to prove that it is a valuable aid in developing the sense of sight and the sense of taste. See REFLEX ACTION; SENSES, SPECIAL.

TOULON, *too loN'*, FRANCE, one of the chief seaports on the Mediterranean, and after Brest the most important naval station of France. Its harbor has five principal basins, connected with surrounding bays. It is easy of access, but is well sheltered and strongly fortified. Toulon was often besieged in numerous wars of medieval times,

and was the seat of Napoleon's first rise to prominence in 1793. The town is in two sections, the old and the new. The old town is characterized by narrow, crooked streets, and the new by wide avenues, public squares and modern buildings. The industries are ship-building, lace making, fishing, vine raising and iron and copper founding. Population, 1921, 106,331.

TOULOUSE, *too looz'*, FRANCE, an important commercial and industrial city on the Garonne River, 130 miles southeast of Bordeaux, the center of traffic between the Atlantic and the Mediterranean as carried on by river and canal routes. It has an extensive trade in wine and grain, and its manufacturing plants include leather and tobacco factories, iron and copper works and manufacturing of carriages and farm machinery. Toulouse is an old town, with many narrow streets and poorly-constructed buildings. It has a varied history, dating back to 106 B. C., when it was despoiled by the Romans. The Visigoths took it in A. D. 419, and the Franks in 507. It was the scene of terrible massacres of the Huguenots in 1562. The objects of main interest at present are the Church of Saint Sernin, the Cathedral of Saint Etienne, the townhall and the University of Toulouse, founded by Pope Gregory IX in the thirteenth century. Population, 1921 (including suburbs), 175,404.

TOURMALINE, *toor'ma lin*, a beautiful mineral found in gneiss, granite and mica schist. It crystallizes in the hexagonal system, and being very hard, scratches glass easily. Some varieties are transparent, some are translucent, and some are opaque. A few are colorless; others are green, brown, red, blue or black—according to the oxides present. The colorless variety is known as *achroite*; green and blue, as *indicolite*; red, as *rubellite*; black, as *schorl*.

The transparent stones are esteemed as gems. Tourmalines are found in many parts of the United States. Blue and green stones occur in Connecticut, Maine, Massachusetts and New Jersey; black crystals are found in New York; several varieties have been discovered in California. The mineral is common in many parts of Europe. The physical properties of tourmaline have made it valuable to science. Under the action of heat and electricity it becomes a conductor of electricity. It also possesses the property of polarizing light. See POLARIZATION OF LIGHT.

TOURNAMENT, *toor'na ment* or *tur'na ment*, or **TOURNEY**, a common sport of the Middle Ages, in which parties of mounted knights encountered each other with lances and swords, in order to display their skill in arms. Tournaments reached their full perfection in France in the ninth and tenth centuries. They were introduced into England soon after the Conquest by the Normans. *Jousts* were single combats between two knights, and at a tournament there would often be a number of jousts, as well as combats between parties of knights. The place of combat was the *lists*, a large open place, surrounded by ropes or by a railing. Galleries were erected for the spectators, among whom were seated the ladies, the supreme judges of tournaments. A knight taking part in a tournament generally carried some device emblematic of a lady's favor. Tournaments gradually went out with the decline of chivalry. So-called military tournaments are now held in the United States and in England. These are assemblages of soldiers, who engage in contests of skill in the use of their arms and accouterments and in athletic sports and games. Exhibition drills are given, and enthusiasm runs high, but there are no longer those tremendous fights to the death which characterized the tournaments of the Middle Ages.

TOURNIQUET, *toor'ne ket*, an appliance employed in the practice of surgery, to stop bleeding temporarily. A string or cord twisted tight with a stick forms a simple tourniquet.

TOURS, *toor*, FRANCE, the capital of the department of Indre-et-Loire, situated on the left bank of the Loire, 145 miles southwest of Paris. It has a noted cathedral of the Gothic style of architecture, an archbishop's palace, a museum, a theater and a statue of Balzac, who was a native of the city. The educational institutions include an art school, the College of San Luis de Gonzaga and a library of 125,000 volumes. The industries include the manufacture of iron and steel products, silk goods, woolen goods, pottery, chemicals and stained glass. Tours is the site of the battle fought between Charles Martel and the Saracens in 732. It was occupied by the Germans in 1871. During the World War, though outside the zone of war activities, it was made the interior headquarters of American supplies and also of extensive hospital service. Population, 1921, 75,096.

TOUSSAINT, *too saN'*, FRANÇOIS DOMINIQUE, called L'OUVERTURE (1743-1803), a patriot soldier and a statesman of Haiti. He was a full-blooded negro, the son of slave parents. He managed to acquire a little education, and when the slaves rose in insurrection in 1791, Toussaint served in their army and later became their leader. After the proclamation, in 1793, of freedom of the slaves, the French government, recognizing his military and political ability, made him general in chief of the troops in Santo Domingo. He defeated the English who had invaded Haiti, and in 1799 was forced into a struggle with the mulattoes, whom he at length defeated. He then became the real master of the island, and his rule was wise and firm. A constitution was drawn up which named Toussaint president of Haiti for life. Under his régime the commerce and agriculture of the island began to revive. Napoleon, however, feared that although Toussaint was professedly loyal to France, he was aiming at independence, and he therefore sent an expedition to subdue him. Toussaint was forced to surrender, was treacherously seized and carried to France, where he died in prison.

TOWER, as commonly understood, a building of any shape, the height of which is much greater than its horizontal dimensions. In ancient times towers were chiefly constructed for defense, and few of the structures now extant antedate the Middle Ages. During that period many towers were erected as ornaments for churches and castles as well as solitary buildings, and a number of graceful shapes and ornate styles were developed. In Italy the bell towers were usually separate buildings near the churches, but in the northern countries of Europe the tower was usually a part of the church. Towers on castles and on castle walls were of use as watch towers and places of defense. The Mohammedans make a conspicuous use of towers for religious purposes.

Cathedrals (which see) of the Middle Ages were characterized by their beautiful towers. Among world-famous towers are the *White Tower* of the Tower of London; the *Eiffel Tower* of Paris; the leaning *Tower of Pisa*; and the *Campanile* at Florence.

Related Articles. Consult the following titles for additional information:

Architecture
Campanile
Eiffel Tower
Lighthouse
Minaret

Pisa, Leaning
Tower of
Round Towers
Tower of London

TOWER OF LONDON, an ancient fortress and prison in London, consisting of a collection of buildings of various ages, now used as an armory. It is situated on a somewhat elevated position on the north bank of the Thames, outside the old city walls. It covers about thirteen acres and is surrounded by a battlemented wall, flanked with massive towers and encircled by a moat. There is also an inner wall, broken by towers and interspersed with buildings. In the center is the White Tower, the keep of the old fortress; around it are the chapel, the jewel house, the barracks and other buildings.

The Tower was a medieval fortress and served at once as a palace, a prison and a place of defense. The White Tower was built by William the Conqueror in 1078 and was successively strengthened by various English sovereigns. The regalia, consisting of the royal crowns and scepters, are now kept and exhibited in the jewel house. The armory contains a fine collection of armor and weapons. In the part called the Bloody Tower, the two young princes, sons of Edward IV, were murdered by order of their uncle, Richard III. The Tower is now chiefly used as an arsenal, and has a small military garrison of the yeomen of the guard.

In the World War the British government imprisoned captured spies in the Tower, and there many of them were executed.

TOWERS OF SILENCE, massive circular stone, brick, or cement structures erected by the fire worshipers of Persia and the Parsees of India. These towers, about twenty to thirty feet in height and much greater in diameter, were the structures upon which the Parsees exposed the bodies of their dead, according to the religious teachings of their leader, Zoroaster, to be devoured by vultures or other animals. The best modern specimens are found in and near Bombay, India. The British government has nearly stopped the practice.

TOWN MEETING, an annual assemblage of the voters of a New England township, at which selectmen, school officials and other officers are elected, laws are enacted and taxes are voted for the coming year. It is a typical New England institution, a survival of colonial days, and is often cited as the most purely democratic system of government known, being that of action by all the people for themselves and not government through elected representatives.

TOWNSHIP, the smallest political administrative unit in a state, except the school district (which see). A township is one of the several divisions of a county; if the county is regularly-formed a township is usually six miles square, and contains thirty-six square miles (see **LANDS, PUBLIC**).

In most states the executive officer of the township is a supervisor, in which case he represents the township on the county board of supervisors, the law-making body of the county. In other states there are township commissioners; sometimes these officers act independently of a county body, but often with and as a part of it.

Study of a Township. School children may systematically study a township from the following outline and suggestions:

The Township

(a) Political features

- (1) Map
- (2) Location in county
- (3) Names of surrounding townships
- (4) Number of school districts
- (5) Area (miles in each direction)
- (6) Location of villages or cities
- (7) Public buildings
- (8) Population
- (9) Government

(b) Physical features

- (1) Rivers
- (2) Creeks
- (3) Deep valleys
- (4) Plains
- (5) Heavy forest areas
- (6) Mountains or great hills
- (7) Lakes
- (8) Swamps

It may be difficult to learn the physical geography of the entire township, for neither pupils nor teacher may have personal knowledge of the facts, and the subject is one on which it is impossible to read in books.

Months will pass in learning the facts relating to local geography as above explained and outlined, and this is well. Relatively small children must not be required to push their investigations far beyond their immediate surroundings. To attempt excursions too far distant invites confusion. Introduce larger political units for study only when the boys and girls are prepared by knowledge of the township to understand the step.

TOXICOLOGY, *toks i kol'o jy*, the science that treats of the nature of poisons, their effects and antidotes, and also of the legal questions arising from poisoning. See **POISON**; **ANTIDOTE**.

TOXINS, *tok'sinz*, poisonous substances which are created in the body through the agency of germs. Under certain conditions they act upon the tissues and produce symptoms of various infectious diseases, such as diphtheria, meningitis and lockjaw. Antitoxins (see ANTITOXIN) are substances which neutralize the effects of toxins. See SERUM THERAPY.

TRACERY, *tra'sur y*, in architecture, a term which denotes the ornamental decoration used most frequently in a window or gallery. Tracery as an art was first practiced in Gothic architecture during the first part of the thirteenth century in France. It was developed in the windows, but gradually extended to almost every part of the church buildings. Styles varied in different ages and countries and are known as geometrical, flowing and flamboyant.

TRACHEA, *tray'ke a*, the windpipe or principal air passage of the body. It begins with the larynx, through which it communicates with the mouth and nose, and it ends with the bronchial tubes, through which it communicates with the lungs. In man this tube is about three-fourths of an inch in diameter and four and one-half inches long, and it consists of an external fibrous membrane and an internal mucous membrane. Enclosed between these membranes there are from sixteen to twenty rings of hard cartilage extending only around the front and sides of the trachea. Between the ends of these rings and attached to them, extending transversely, is a layer of unstriped muscle, whose function is to decrease the size of the tube, by drawing the ends of the rings nearer together.

The surface of the mucous membrane is covered by a layer of cells, each bearing a tuft of tiny hairs or cilia. The cilia move in such a direction that anything resting on them is drawn toward the mouth. In this way phlegm is removed. Many mucous glands pour their secretion upon the surface of the interior.

TRACHEOTOMY, *tra ke ot' o my*. See CROUP.

TRACHYTE, *tra'kite*, or *trak'it*, a volcanic rock containing potash, feldspar, lime, soda and hornblende, together with an oxide of iron and manganese and a few other minerals in small proportion. In composition it is similar to syenite, but in appearance resembles porphyry, on account of the large

crystals of feldspar scattered through it. Trachyte is usually light-colored, but it may be of any shade of gray, or black. The rocks of this class are found in South Dakota, Colorado, Montana and Wyoming, but more generally distributed in Europe, where they are found in Italy, France and Germany.

TRACTARIANISM. See OXFORD MOVEMENT.

TRACTION ENGINE, or **TRACTOR**, a self-propelling steam engine, designed to haul and operate farm machinery, and sometimes used for hauling wagons and vans over common roads. The typical traction engine was once a high pressure engine with a horizontal boiler, the whole device mounted upon four wheels, and many of this class are yet found. The rear wheels are large and broad and have the tires constructed to prevent slipping. The forward wheels are connected with a steering apparatus. The engine is horizontal and is attached to the top of the boiler. It has an adjustable gear, by which it can be attached to the rear wheels when it is desired to propel the engine over the road. When the engine is used for operating machinery, this gear is detached.

Since the perfection of the internal combustion engine, many types of tractor have been invented, and these are finding great popularity on farms. They are made on the automobile principle, with bodies designed for various kinds of farm work. Those most generally purchased by farmers use a less expensive fuel than gasoline—such as kerosene or distillate for power. The *caterpillar* pattern is popular with many farmers because of its great hauling power, and because, like the tanks used in the World War, it can pass over ground where tractors of the ordinary type cannot be used. See TANK, ARMORED.

TRADE ACCEPTANCE, a commercial term used to designate a particular form of credit, and defined as "a time draft or bill of exchange drawn by the seller of a bill of merchandise on the buyer for the purchase price of the goods, and bearing on its face the signed acceptance of the buyer with the date and place of payment."

To illustrate: A. B. Smith & Company of Boston, sell to J. M. Hardy & Company, of Chicago, a bill of merchandise amounting to \$2,500. The time draft for this amount accompanies the bill of lading. J. M. Hardy & Co. stamp *Accepted* across its face, design-

nate the date and place of payment and return the draft to A. B. Smith & Co., who may hold it until it becomes due or discount it at the bank.

Trade acceptance is a comparatively new method of merchandising in America, having originated in 1917, but it has been in use in other countries for a long time. It is indorsed by the Chamber of Commerce of the United States, the American Bankers Association and the National Association of Credit Men. It is claimed for it that it makes for better business, creates a better class of accounts, insures more prompt attention to payments when they become due, and extends the use of negotiable paper.

TRADE-MARK, an emblem or device, used by manufacturers to distinguish their productions. Such marks have been in existence for centuries, but it is only in recent years that they have been legalized. They may now be registered and protected in all the more important countries and even by citizens of one country in another. According to the trade-mark statutes of the United States a mere descriptive title or a geographical name does not constitute a proper trade-mark; it should be some invented word or words, distinctive device, figure, emblem or design, or a written signature. Any mark or name calculated to mislead as to the real name or origin of the goods is invalid. Trade-marks are registered at the Patent Office, at a fee of \$25, the right running for thirty years.

TRADE UNIONS. See LABOR ORGANIZATIONS.

TRADE WINDS, perpetual or constant winds which occur in all open seas on both sides of the equator, for a distance of about 30° north and south of it. North of the equator their direction is from the northeast, with occasional slight variations; south of the equator they proceed from the southeast. Their importance to ocean commerce before the days of steam navigation gave them the name of *trade* winds.

These winds result from the differences in temperature between the equatorial and polar regions. The heat of the torrid zone causes the air there to become lighter and consequently to rise. As it rises the cooler surface air north and south of it rushes in to take its place. This movement of air is constantly going on. The oblique direction of these winds is accounted

for by the fact of the earth's rotation. The belt between the two systems of trade winds is a region of calm, which, in the days of sailing vessels, was dreaded by mariners. This belt shifts somewhat with the seasons.

Over the land areas these winds are displaced by air currents caused by various local conditions, and they are not often to be identified except in certain localities or at certain seasons. In some regions, however, they have marked effect upon climate. Laden with moisture, they cross South America and on reaching the Andes are forced upward to levels where their moisture is condensed into rain. In crossing Africa they precipitate their moisture in the eastern highlands, and by the time they reach the region of the Sahara Desert they are dry. See WIND.

TRAFALGAR, *trah fal gahr'*, a low and sandy cape on the southwest coast of Spain, at the northwest entrance of the Strait of Gibraltar, which gave its name to one of England's most brilliant naval victories. Off this cape the British fleet under Nelson practically destroyed the larger French and Spanish fleet under the command of Villeneuve and Gravina, on October 21, 1805.

TRAGACANTH, *trag' a kanth*, a gum produced by several species of the pulse family, which are natives of certain mountainous regions of Western Asia. The gum oozes through cracks in the bark in twisted threads, which are yellowish in color, and tasteless. It is shaped in thin cakes for the market. In pharmacy tragacanth is used, because of its harmless, gummy quality, to shape pills, and it is also made into lozenges and used to relieve sore throat.

TRAGEDY, *traj'e di*, in a broad sense, that form of the drama which deals with a serious theme in dignified language and which ends with disaster to some of the characters. The word *tragedy*, from the Greek for *goat songs*, was first applied to the chants at the festival of Bacchus sung by men in goatskins. These chants were the beginning of tragedy. Among the Greeks tragedy was highly developed, Aeschylus, Sophocles and Euripides each contributing to its growth. The Greeks believed the function of tragedy to be the "purification of the passions through the arousing of fear and pity." Wherever the drama has flourished, tragedy has had a conspicuous place. In English literature Shakespeare's *Hamlet*, *Macbeth*, *Othello*, *Julius Caesar* and

King Lear are the finest examples of tragedy; while Racine's *Athalie* and Goethe's *Faust* stand as representative masterpieces of the French and German drama.

The tendency of the present day is to replace tragedy with lighter, less serious plays, known as comedy (which see).

TRAG'OPAN, a large beautiful bird of the pheasant family, native to the Himalayan forests. These birds have variegated plumage, and the males are characterized by blue, horn-like protuberances over each eye, and they have large throat wattles. The birds nest in trees and feed on leaves, fruit, seeds and insects. The eggs are white, speckled with lilac.

TRAILING AR'BUTUS. See ARBUTUS.

TRAILL, CATHERINE PARR (1802-1899), a Canadian author, born in London, England. In 1832 she married Lieutenant Thomas Traill and emigrated to Canada, settling at Rice Lake, Ontario. Mrs. Traill won distinction by her contributions to English magazines and her other literary works. She is author of the *Backwoods of Canada*, *Canadian Crusoes*, *The Female Emigrants' Guide*, *Lady Mary and Her Nurse*, and *Rambles in the Canadian Forest*. Among her later works of distinction are *Pearls and Pebbles; or Notes of an Old Naturalist*, *Cot and Cradle Stories*, and *Studies in Plant Life in Canada*.

TRA'JAN (MARCUS ULPIUS TRAIANUS) (51-117), a Roman emperor, famous also as a military leader. He was born in Spain, the son of a distinguished Roman commander under Vespasian, and early in life distinguished himself in the army in Spain; in Syria and in Germany. In 97 he was adopted by the Emperor Nerva, and the following year succeeded him. Much of his reign of nearly twenty years was spent in frontier campaigns. Trajan conquered Dacia and Armenia and made them Roman provinces, and reduced Mesopotamia, Arabia, Syria and Armenia to submission. The celebration at Rome of one of his triumphs lasted four months, in the course of which time 10,000 gladiators and 11,000 wild beasts met death in the arena. In 103 he wrote a famous letter to Pliny, governor of Pontus and Bithynia, directing him not to search for Christians, but to punish those brought before him, and on no account to listen to anonymous charges. Trajan's rule was marked by a number of progressive measures. He reduced taxes and improved the administration of the

provinces, stopped abuses of the law and beautified Rome.

Arch of Trajan, an arch at Benevento erected under the direction of Trajan to celebrate the opening of a new road to Brundisium. The structure is fifty feet high; the arch, twenty-seven feet. It is of white marble and is decorated with relief sculpture illustrating Trajan's victory over the Dacians. It is one of the best examples of the Roman arch.

Trajan's Column, a beautiful column erected at Rome in A. D. 114 by the Roman Senate, in honor of Trajan, who had achieved a series of military triumphs for the empire. It is 100 feet high and is covered with figures in relief illustrating the emperor's victories. Inside the column is a spiral staircase leading to the top, which when erected held a statue of Trajan. This figure was replaced in the sixteenth century by a statue of Saint Peter.

TRANCE, *trans*, a peculiar condition in which the person affected is able to move about and speak, but is not under conscious control of his faculties. When the trance stage is past he has no recollection of his acts or utterances while in that condition. Certain drugs have the power of putting people in the trance state, and the condition is also induced by hypnotism (which see).

TRANSCENDENTALISM, *tran sen den' tal iz'm*, a system of philosophy taught by a school established in New England about the middle of the nineteenth century by some of the foremost American thinkers and writers. The beliefs of the Transcendentalists are hard to define, since they had no fixed creed. Their leading idea was the supremacy of mind over matter, and they maintained that the truth of religion did not depend on tradition or historical facts, but that it has always an unerring witness in the soul. They believed that every person born into the world was possessed of a faculty which enabled him to perceive spiritual truth when this truth was clearly presented. A Transcendental club was founded by George Ripley in 1836, and the school was the outgrowth of this movement. Among the most eminent Transcendentalists were Ralph Waldo Emerson, James Freeman Clarke, A. Bronson Alcott, Theodore Parker and Margaret Fuller.

TRAN'SEPT. In many Christian churches the central floor space is in the form of a Latin cross, with the central aisle leading to

the altar and a broad aisle crossing it there. This cross aisle, corresponding to the arms of the cross, is called the transept.

TRANSFORM'ER, a device used for changing the potential of electric currents. The transformer in most common use changes the current from a high to a low potential and is a form of induction coil (see **INDUCTION COIL**), in which the inner, or primary, coil consists of many turns of fine wire, with an outer, or secondary, coil of a few turns of coarse wire. This transformer is used in electric lighting, for reducing the potential of the current as it is taken from the main wires for supplying incandescent lights in buildings. See **ELECTRIC LIGHT**.

TRANSFU'SION OF BLOOD, an operation consisting of the injection into one person of blood taken from another. The transference may be direct, that is, from vein to vein; or indirect, with the blood freed from fibrin and injected from a receptacle. The operation is useful in restoring the strength of a person who has suffered loss of blood from hemorrhage or surgical operations, and in cases of gas poisoning, burns, cancers and other disorders involving irregular blood conditions.

TRAN'SIT, in astronomy, 1, the passage of a heavenly body across the meridian of any place, a phenomenon which is usually noted by a transit instrument. The determination of the exact times of the transits of the heavenly bodies across the meridian of the place of observation enables the astronomer to ascertain the differences of right ascensions, the relative situations of the fixed stars and the motions of the sun, the planets and the comets, in respect to the celestial meridians. 2, The passage of one heavenly body over the disk of a larger one, this term being usually restricted to the passage of Mercury and Venus over the sun's disk.

Transit Instrument, an astronomical instrument, adapted for observing the exact time of the passage of heavenly bodies across the meridian. It consists essentially of a telescope, fixed at right angles to a horizontal axis, which latter has its ends directed exactly to the east and west points of the horizon, so that the optical axis of the telescope may move in the plane of the meridian. A thread passing across the center of the object glass parallel with the plane of the meridian, enables the observer to note, to the fraction of a second, the time of the passage of a star.

TRANSIT OF VENUS. See **VENUS**, sub-head *Transit of Venus*.

TRANSMIGRATION, *trans mi gra' shun*, **OF THE SOUL**, or **METEMPSYCHOSIS**. Many persons believe that after the body dies the soul passes into some other material form—into other human bodies, or even into the bodies of lower animals. This has been known throughout the ages as transmigration of the soul. It found a place in the religions of the ancient Egyptians, of the Hindus and even among the profound philosophers of Greece and Rome it was believed.

Many men of profound metaphysical genius, both in Europe and America, have supported this doctrine and attempted to give it a logical or scientific basis, and for a large class of persons it has a strong attraction.

TRANSPORTATION, the story of man's efforts to conquer nature so that he can travel swiftly over the earth reads as interestingly as a fairy tale. It cannot be found complete in any one book or in a dozen books, but is a part of the record of each great nation separately. America has made a greater contribution to methods of transportation than any other country.

The first boat was probably the top of a log floating down stream, with the savage rider astride; then he hollowed out the log, and it was a "dugout." The distance from this to the gigantic, oil-burning steamship marks the toil of thousands of years. Land transportation exhibits the same miracle of progress—from the dragging sticks which the Indian attached to his horse, to the solid-wheeled wooden cart and up to the giant locomotives which have reached a speed of over 100 miles an hour for short stretches. Water, land—then air—transportation! All over Europe flying machines are carrying passengers; we shall soon see like air routes in North America.

The illustrations show us that in some parts of the earth the methods employed are the same as before Christ was born; they never have changed.

TRANS-SIBE'RIAN RAILWAY, a line of railway connecting the transportation systems of Russia with the port of Vladivostok, on the Sea of Japan, until 1918 the most eastern outpost of the great Russian empire. The Trans-Siberian Railway was the outgrowth of a number of projected plans for establishing means of communication

COMMON CARRIERS AND THEIR BURDENS



Want a ride that's different? Call up the Central Taxi Company at Hailar, Mongolia, and this limousine is at your service to go anywhere, any time — with no speed limit and no traffic policemen. The country IS dry, but in one sense only.

Photo from Underwood & Underwood

A Chinese coolie can transport half a ton on a barrow, working all day long, traveling miles, for wages that wouldn't feed a child in this country. The weight of the barrow and its load is largely supported by a strap over the shoulders, while he does the balancing stunt with the handles. People as well as goods are carried.



© Underwood & Underwood



Scene at Hankow on the Yangste River in China about six hundred miles from the sea. An interesting comparison of various modes of transportation. Bullock carts, three kinds of river boats, a river steamer and an ocean liner. China today is the land of the most astonishing contrasts: ancient and modern, East and West, live, up-to-date salesman and old-type Chinese with all his thoughts deep in the graves of his ancestors.

© Underwood & Underwood



© Underwood & Underwood

Rapid transit in the streets of old Bagdad. A modern street-car line from the "downtown" district out to the suburbs. Electricity hasn't arrived yet, so it's a pair of horses or mules for motive power. The motorman may be Abdalla. All aboard for a new series of Arabian Nights Entertainments. "Let's go."

A camel caravan just coming into a village from the great desert. This sort of transportation has been going on just as we see it here for a thousand years. Do you think a modern railroad will ever put these camels out of business? What would it do to these Eastern people if they were once made to hurry?



© Underwood & Underwood



Photo from Keystone View Company, Inc.

And now back to, "The Land of Room Enough," where, nevertheless, time and space are money and as much as possible must be crowded into both. An airplane view of docks and freight yards at New York, on the New Jersey side of the river. Tow boats, car floats, lighters, canal boats and ocean liners. Could any picture be more typical of hustling America?

between the Russian possessions in Europe and Asia. Its construction was approved by an imperial rescript given by the Czarovitch, later Nicholas II, March 17, 1891. Work was commenced immediately, and the main line was completed in 1905. The line as

of normal width and is everywhere substantial. Drainage is secured by means of iron and clay pipes; bridges over culverts and small streams are solidly built of stone or wood, but those over the large rivers are of the best patterns of steel truss. The bridge



originally planned was divided into six sections, as follows: Western Siberian, from Chelyabinsk to Omsk, 878 miles; Central Siberian, from Omsk to Irkutsk, 1,134 miles; Trans-Baikal, from Myosava to Stretensk, 685 miles; Amur, from Stretensk to Khabarovsk, 1,373 miles; Usuri, from Khabarovsk to Vladivostok, 474 miles. The Amur section was later replaced by a line running farther south through Manchuria, known as the Manchurian Section. This section extends 952 miles from Nagaden, where it leaves the main line; it also has a southern branch extending to Port Arthur, thus giving the railway access to a port which is free from ice the entire year. The distance from Chelyabinsk to Vladivostok is 3,961 miles, and to Port Arthur, 4,238 miles. The entire system has 6,800 miles of road.

The Western Siberian division passes through a level country and proved easy of construction, but the Trans-Baikal division presented great engineering difficulties, in the way of apparently bottomless marshes and mountainous regions requiring steep gradients. Owing to the time required for constructing the road around Lake Baikal, the line was opened to traffic before this section was completed, and for nearly three years cars were transferred across the lake by ferry. The roadbed is planned for rails

over the Irtysh River is nearly four miles long and is considered one of the finest railway bridges in the world. The stations along the line are commodious in plan and artistic in design; they are placed thirty-three miles apart.

The Trans-Siberian railway is the greatest project of the kind that has yet been carried to successful completion. By the old routes of travel it required forty-five days to go from Saint Petersburg to Peking, by the Suez Canal and the Indian Ocean, or thirty-five days via New York, San Francisco and the the Pacific. By the Siberian railway, one can go from Moscow to Vladivostok in nine days.

During the World War, especially following the downfall of the autocracy, the Trans-Siberian Railway was of great strategic importance. After the Bolsheviki seized the power in Russia the Siberian portion of the road came under control of the allies and the anti-Bolshevik Siberians. In the spring of 1919 an allied commission was formed to rehabilitate the road. A prominent member of this commission was the American railway expert, John F. Stevens. See SIBERIA.

TRANSVAAL, *trans'vahl*, **THE**, a province of the Union of South Africa, extending from the Limpopo River, on the north, to the Vaal River, on the south. The name means

across the Vaal. The province is bounded on the east by Portuguese East Africa, on the west by Bechuanaland, on the south by Orange Free State and on the north by Rhodesia. With an area of 110,426 square miles, it is about as large as Nevada, and about four times the size of the Canadian province of New Brunswick.

The People. According to the census of 1921, the Transvaal had in that year 2,087,636 inhabitants, of whom 543,485 were whites. The majority of the whites are Boers, or South African descendants of the early Dutch settlers. The native peoples are tribes of the Bantu family, and are of the negroid type. Most of these tribes still maintain their customs and tribal government, but many of the men are in the service of the colony as laborers in the mines and on farms. Pretoria, the capital, and Johannesburg, the mining center of Witwatersrand, are the largest cities.

Surface and Drainage. Most of the country is a high, undulating plateau, with hills and mountain ranges extending through the interior. The tableland varies in height from 4,000 to 6,000 feet, in the south and east, to between 1,500 and 4,000 feet, in the north. The Drakensberg Mountains extend north and south across the eastern portion and reach an altitude of 8,700 feet in Mauchberg Mountain, the highest peak. The boundary between Transvaal and Portuguese East Africa is formed by the Limpopo Mountains. The Witwatersrand is a height of land, gradually rising to an altitude of 6,000 feet, extending across the country approximately in an east and west direction, and forming the watershed between the Limpopo and the Vaal rivers. The southwestern part of the colony is a broad, flat plain. The chief rivers are the Vaal and Limpopo, with their tributaries.

The climate is temperate and, in the main, healthful. It is characterized by intense heat during the summer and by heavy rainfall. These conditions produce malaria in the lower levels, but the winter months are cool and invigorating. The annual rainfall is about 26 inches.

Industries. The settlers are largely engaged in stock raising and agriculture. All of the cereals and most vegetables are produced in paying quantities. Corn and tobacco are the chief crops. Extensive grazing regions adapt this country to stock growing, and large numbers of cattle, horses,

sheep and goats are found in the colony. The mineral wealth, however, is the chief source of income. This consists of gold, which is extensively mined on the Witwatersrand, in the vicinity of Johannesburg and Barborton, and of diamonds, which are obtained in the vicinity of Pretoria. The gold taken from the mines in 1918 was valued at over \$189,000,000; and the annual output of diamonds is about \$20,000,000. The province has over 2,360 miles of railways, which connect Pretoria, Johannesburg, Pietersburg and Leydenburg with the chief towns in Orange Free State, and these are connected with the trunk line of the Cape-to-Cairo Railway.

Government. The executive head of the government is the administrator, appointed by the governor-general for a term of five years. The administrator presides over the meetings of the provincial council, composed of thirty-six members elected for three-year terms. An executive committee of four, not necessarily members of the council, acts as cabinet or ministry. The provincial council may legislate on all local matters, including finance, elementary education, agriculture, roads and bridges, and municipal institutions. All legislation is subject to the veto of the governor-general-in-council. The province sends eight senators and forty-five representatives to the Union Parliament.

History. The Transvaal was settled by Dutch emigrants from Cape Colony in 1835 and 1836. These people emigrated northward because they were dissatisfied with the British rule in Cape Colony. Because of wars with the native tribes, the colonists were compelled to apply to British authorities for protection. This was granted, and it became necessary for the British government to assume control of the colonies, in order to preserve peace with the native tribes. To this arrangement the colonists agreed in 1877. Afterwards they protested against annexation to the British dominions, and in 1880, under the Gladstone ministry, it was recommended that the political independence of the country be restored. The South African Republic was proclaimed by the people, in December, 1880. In 1881 a convention was signed by Great Britain, granting independence, except in external affairs. This was superseded by another convention in 1884. Meantime, the Boers were preparing for war, and in a short campaign they administered a serious defeat

to the British troops. With the discovery of gold in Witwatersrand, in 1884, there came a large influx of foreigners, who settled about the mines. The discovery of diamonds also caused an increase of foreign population, and the Boers became alarmed lest these foreigners, *uitlanders*, outnumber the original citizens and assume control of the government. In order to prevent this, the South African Republic refused to grant foreigners franchise and certain other rights, except under great restrictions and difficulties.

The excess led to another, until war was declared in October, 1899. The Boers were defeated, and the South African Republic, under the name of Transvaal Colony, was annexed to the British dominions, on September 1, 1900. Until 1905 the government was under the control of an administrator; but local government was being reestablished, and complete self-government was restored in 1907, when the first responsible ministry took office. On May 31, 1910, when the Union of South Africa was established, the Transvaal became a province.

Related Articles. Consult the following titles for additional information:

| | |
|-----------------------|-----------------------|
| Bantu | Pretoria |
| Boer | South African War |
| Cape-to-Cairo Railway | Union of South Africa |
| Johannesburg | |

TRANSYLVANIA, *tran sil va' nia*, from 1867 to 1918 a territory belonging to the Hungarian Crown, occupying the southeastern corner of the kingdom. It has an area of 21,518 square miles. On the east and south it is bordered by the Carpathian Mountains, which separate it from Rumania. Rumania laid claim to Transylvania at the close of the World War, as over half its people are Rumanians. There is a small German minority. The nobility and gentry, however, are Hungarian, or Magyar, and among those classes opposition to annexation developed. The disposal of the region was to be decided by the peace conference. Transylvania is generally mountainous, but it has a fertile soil and produces wheat, barley, rye, oats, flax, tobacco and fruits. Stock raising is a profitable source of income, and horses of superior breed are exported. The region is famous for its scenery, and is of great interest to tourists because of the variety and charm of the peasant life and costumes. See HUNGARY; RUMANIA; WORLD WAR.

TRAPDOOR SPIDER, a name given to certain spiders that have the habit of constructing tubular dwellings in the ground,

sometimes a foot or more in depth and an inch or so in diameter, and closed by a kind of hinged door. They belong to warm climates and are found in Southern Europe,



TRAPDOOR SPIDER AND HIS HOME

Western North America and North Africa. The dwelling is lined with the silky substance spun by the spider and the hinge of the door is formed of the same, the door itself being constructed sometimes of earthy particles connected by threads, sometimes of leaves and twigs. When the spider is alarmed it runs into its tunnel and hangs to the closed door by its jaws. These spiders are large and belong to the tarantulas. They feed upon wingless insects, and sometimes upon earthworms and caterpillars.

TRAPE'ZIUM, according to Euclid, a quadrilateral having two of its sides parallel. In the United States it is a four-sided figure having none of its sides parallel. The area of the latter figure is computed by multiplying the length of the diagonal by one-half the sum of its altitudes.

TRAP'EZOID, a quadrilateral of which no two sides are parallel. The term is usually reversed in the United States and made to mean four-sided figures with two parallel sides. With the latter definition, the area is equal to one-half the sum of the parallel sides, multiplied by the altitude.

TRAPPING, a sport for residents of rural districts and still a resource of the hunter in the far north, is the taking of birds and animals by traps, or snares, instead of killing them with weapons. Traps are of various kinds, such as the nets that are used for fish; the snares and box traps, to imprison birds and quadrupeds; the dead-fall, which kills by weight, and the steel spring traps, which in various sizes are used for all animals, from the mouse to the bear. The steel trap is the most cruel of all, because it does not usually kill, as does the dead-fall, nor imprison an animal, as the box traps do, but catching only by the leg, holds its captives in suffering

ill they are killed and released by the trapper. Some animals when caught by a foot in a steel trap will release themselves by gnawing off the imprisoned member; this is most common among muskrats, and accordingly, hunters set their traps so that the animal will drown soon after being caught.

TRAPPISTS, a branch of the Cistercian Order of monks, one of the most rigorous of the Roman Catholic Church. The Order had its origin in France in 1664, but was expelled from that country at the time of the Revolution, and again in 1903. Their monasteries are found in different localities in Europe, Asia, Africa and North America, in all numbering about seventy-five, with a membership of 4,000. The Trappist is under a vow of perpetual silence, except when it becomes necessary to speak to guests. He sleeps in his habit, removing only his shoes; much time is spent in meditation and prayer, and several hours a day at hard labor.

TRAVELS IN DISTANT LANDS. In the following pages the reader is invited to go in imagination to four of the most interesting places on the globe—Japan, the Philippines, the Hawaiian Islands and the Lesser West Indies.

Japan, "Land of the Rising Sun." As your steamer is finishing the last lap of that long journey across the Pacific, you might profitably look into the guide book for a few statistics regarding the empire you are approaching. On the map Japan seems to be a long string of islands standing guard before China and Manchuria. No wonder some of the islands are mere dots, for all told they number over three thousand. From the most northerly of the Kuriles to the extreme southern point of Formosa they extend over a distance of something like two thousand miles. If you plucked them out of the Pacific and swung them across the United States, with the Formosa extremity anchored at San Francisco, the Kuriles would land somewhere in the vicinity of Chicago. We are especially interested, however, in the four large islands south of the Kuriles, for they constitute the vital part of the empire. Here live the Japanese proper, with their love of art and beauty, and their quaint and curious customs.

The traveler bound for Japan's largest city and seat of government—Tokyo, on Hondo Island—finds himself landed at Yokohama, eighteen miles to the south of the great city.

Though it has the distinction of being both the capital and the metropolis of an empire, Tokyo has no suitable harbor for large ships, and Yokohama serves as a port. It is no matter, since railroads have long since found their way into the Orient.

As you step off the steamer dock you hear a dozen voices clamoring for your baggage, just as in the world you left behind you, but what you imagine to be the equivalent of "Cab here," is, no doubt, "Jinrikisha." At least you soon find yourself and your luggage safely bestowed in one of these interesting vehicles, and are rapidly borne away at a dizzy rate of speed to the station of the "Tokyo tram."

The trip to Tokyo is short. The train passes quickly through a level country devoted chiefly to rice fields and truck gardens, varied now and then with a quiet village of low houses. Arrived in the capital city, you again entrust your life and property to the tender mercies of a coolie, and are "rikishawed" through a labyrinth of streets and alleys to your inn. While you are enjoying this novel ride in a two-wheeled perambulator, take a look about you.

Tokyo seems a hit and miss city, and well it may, for it has had a tempestuous history. Born a fisherman's hut on the marshy shore of a shallow bay, it grew into a fishing village, expanded from that into the residence of the shoguns, and finally became the capital of the empire. But this growth—from a hut to a city of over 2,000,000 inhabitants—was not an uninterrupted affair, for earthquakes, fires, floods and pestilence have repeatedly destroyed thousands of homes and their inmates. Each great disaster has been followed by a widening of some of the ancient thoroughfares, and an attempt has been made to defy the earthquakes by means of steel and concrete buildings of moderate height. However, the low, broad structures are still by far the most numerous, and there are no skyscrapers, or tall towers or lofty spires. The streets are a bewildering maze of the old and the new, for the widening process has not progressed far enough to have achieved uniformity. Except in the newest quarters, sidewalks are dispensed with as a useless luxury; in fact, some of the streets are so narrow a sidewalk would be an impossibility.

The area of Tokyo, according to a recent city handbook, is about thirty square miles. It must have been difficult to estimate this

area, because of the persistence of the suburbs in nosing their way into the heart of the city. A suburb, as every Westerner knows, is supposed to grow up and settle down on the outside of a city, but Tokyo suburbs have



A JAPANESE LITTLE MOTHER

a way of maintaining themselves on the inside. However, suburb or city, it is all very fascinating to the traveler perched on the high seat of the 'rikisha, watching the swift-footed coolie thread his way through the crowded streets.

The 'rikisha men are by no means the only biped burden bearers. Two-wheeled carts containing merchandise of every description, and drawn by the head of the family, are everywhere seen. A willing wife—helpmate in a literal sense—trudges behind and pushes, while the young son and heir placidly sleeps on his mother's back. Porters with incredibly heavy loads on their shoulders, street peddlers, bicyclers, now and then a motor-cycler, laborers, school children, tourists and their guides, shoppers, beggars—in fact, a throng as hit and miss as the city itself presents a perpetual moving picture to the onlooker. In addition, there are a few street cars, but, as one experienced traveler has said, "It gives us a shock every time we meet a street car in Tokyo; they are abominably out of place, exasperatingly deliberate, usually overcrowded, and astonishingly cheap. The picturesque, speedy and exclusive 'rikisha is comparatively expensive, but let us

hope it will successfully resist its rival, for a Japanese city without it would be indeed a sorry place."

Having had an interesting journey through Tokyo streets, you will next seek the hospitality of a Tokyo hotel. One may put up at any of several hotels conducted on the Western plan, but who wishes to travel across the Pacific for the privilege of doing what may be done at home? Life in a Japanese hotel is brimful of interest, and its discomforts depend entirely on one's mental attitude. When you enter you take off your shoes, for the Japanese are extremely particular about having dirt tramped into their spotless houses. Provided with house slippers on the sandal order, you are conducted to a room containing no chairs, no bed, no dresser, no carpet, no writing desk—not anything a hotel room is supposed to contain. A mat or two, a screen, a picture—that is about all the furniture.

You arrange yourself on a mat, tailor-fashion, and make a desperate effort to train your legs to assume the folded attitude, for so long as you are a guest in a Japanese hotel you cannot sit on a chair. There is none to sit on. A dainty maid enters the room and proceeds to make you comfortable with fire and food. Furnaces are unknown in true Japanese houses, but heat is carried about from place to place in a charming firepot. This receptacle is partly filled with ashes, in the center of which there is heaped up a miniature volcano of hot charcoal. A dining table, consisting of a small tray elevated on legs a few inches high, is brought in and spread with food. You eat, perhaps, fish, soup, boiled bamboo shoots, sweet bean cakes and rice, and everything must be conveyed to the mouth with chop sticks. Knives, forks and spoons are nowhere in evidence. The meal is finished off with a few bowls of tea, brewed through the agency of a gridiron placed over the charcoal volcano, and a tiny teapot.

Going to bed also has its novelties. The dining tray is removed after the meal is concluded, and the room is converted into a sleeping chamber by the simple process of having the bed brought in. A Japanese "boy," who may be anywhere from twenty-one to seventy-five years old, takes it out of a compartment in the wall, and the dainty maid makes it up. It, by the way, consists of three thick pads and a sheet on which you lie, and two heavy quilts which lie upon you, the

quilt next above you being lined with a sheet. The pillow is a sort of hard roll upon which the tourist's head somewhat uneasily rests.

It is a part of the maid's duty to disrobe the guest at bedtime, and array the drowsy one in a picturesque kimono. At any rate, she will remove as many of your garments as your Western ideas of propriety will permit.

Throughout all of your sojourn in the hotel you will be impressed by the extreme courtesy of the servants. One and all, they bow down before the guests with untiring grace and agility. If you are fortunate enough to be entertained in a private home you will learn as never before what true hospitality means. The Japanese will accept utter strangers into their homes and urge them to remain indefinitely. Politeness seems to be an inborn trait, and it is reflected in the serene and peaceful countenances of these interesting little people. It is said that in some of the remoter villages children on first viewing American or European travelers cry out in terror at the cross looks of the strangers. Even a funeral is carried on with cheerful decorum, for it is a breach of etiquette to depress the world with signs of grief.

Westerners marvel especially at the politeness of the train officials. A traveler relates that while he was journeying from Tokyo to Nagoya he noticed the conductor bowing to the passengers in the coach, and making a sort of sucking sound by drawing in his lips. (This practice of hissing, by the way, is a common sign of etiquette in Japan.) The passengers in turn bent their heads and began to make the same noise, "as if everybody had begun to eat soup." After a few minutes everyone sat at attention, while the conductor made some kind of an announcement in a dignified voice, and bowed himself out. On being asked the meaning of this strange performance, a native seated next to the Westerner told him that the conductor had merely announced the next station.

Traveling on the train in the mikado's realm has its joys, but the ideal way to see the country is to journey in 'rikishas. Runners may be procured for a reasonable sum, and they will literally run for days in rain or shine, over the worst roads, and never seem to tire or grow irritable. The country roads in Japan are unspeakably bad, but the 'rikisha men are a cheerful and a "husky" lot. The country scenery possesses wonderful

charm. Japan is a land of mountains, green vales, lakes, cascades, rushing streams, ravines and lovely woodlands. You may wander through endless villages, always quaint and clean, always filled with the same happy, contented people. Sometimes you come upon acres of mulberry bushes, and again there seems to be no end of rice fields. The wayside teahouses, whose daintiness and beauty must be seen to be appreciated, are numerous and inviting, and there are unknown numbers of shrines and temples, of artistic interest even to the skeptical foreigner. Probably the average traveler leaves the island empire with a very definite impression of beauty. As his steamer sails away and he looks regretfully back there meets his eye the cloud-kissed summit of the ethereal "Peerless Mountain"—Fujiyama; so to the last Japan weaves its spell of enchantment.

In and About Manila. Not long ago an enterprising hemp buyer was conversing with a group of travelers on board a steamer approaching the Philippines. "When I first went to Manila," he said, "back in the eighties, the place was nothing but a death trap. Now it is a health resort." The journals of those courageous Americans who took up the task of remaking the islands after the Spanish-American War bear out the hemp buyer's testimony: they are full of references to heat, disease, insects, poverty and squalor. True, the climate of these Oriental lands cannot be changed, but after viewing the results of twenty years of colonization one comes to the conclusion that the prevalence of disease in the Far East is more a matter of unsanitary conditions than of climate.

It is a beautiful and healthful city that lies in dim outline against the distant horizon, as our steamer crosses the entrance of Manila Bay. The bay is almost large enough to be called a sea, though it is land-locked, and in stormy weather its waves are like those of the ocean. As we draw nearer we can make out the picturesque walls of Old Manila—Intramuros it is called—the suburbs scattered along the shore, and in the background a semi-circle of lovely mountains. A river—the Pasig—winds down to the bay, separating Intramuros from the suburban sections, and when our steamer comes to the dock we notice at the mouth of the stream a low fortress. This is Fort Santiago, where in the days before the war, the Spanish were accustomed to imprison Filipino rebels.

The aspect of the old walled city is charming, for the work of cleaning up to which the Americans applied themselves so vigorously has not deprived the city of its Spanish character. The picturesque walls and stately gates are there intact, except for a short section along the Pasig, and the foul-smelling, stagnant moats, once the breeding places of hordes of mosquitoes, have been drained and filled up. In their stead are charming parked areas and driveways. Within the walls we find the churches, monasteries, convents, public buildings and homes of the Spanish régime—attractive examples of Spanish architecture modified by a tropical climate. As a protection against the heavy downpours of the wet season the windows are often shaded by overhanging eaves and canopies, and charming galleries are built around the buildings to keep out the intense heat. Ventilation is absolutely necessary in the tropics, and this is assured by wide windows, high ceilings and sliding screens for walls. Another interesting feature of the typical Filipino building is the conch-shell

with the finest in Europe or America. A traveler who visited Manila shortly after the close of the war of 1898 tells of his experiences in the "best hotel" of that period. Hopefully viewing the bills of fare for breakfast, he "passed up" the first two items—watery gruel and Oriental beefsteak—and called for an omelette. There were, by the way, six egg dishes listed, and he felt safe in making this choice. One can imagine his feelings when the grinning Chinese waiter remarked, "No have got eggs." In those days ice was a commodity, rare and precious, and about the only safe beverage for a white man to drink was American beer. Through the modernization of Manila the Westerner now has practically all the comforts of home.

Not the least of the wonders of the bay shore is the wide, handsome boulevard which skirts the sea for fifteen miles, from the Luneta to the naval station of Cavite. The Luneta, just outside the walls of Old Manila, is an oval-shaped pleasure ground, the chief promenade of the residents during the Spanish régime. It has been enlarged and beauti-



CLEAN, SANITARY LIVING TAUGHT BY AMERICANS

window pane. The soft translucency of this material shuts out the fierce glare of the sun and provides a soothing, mellow light.

The Americans have performed wonders with the bay shore. Large sections have been reclaimed from the sea, and a group of stately government buildings and a mammoth hotel have risen on the new sites. The new Manila Hotel, fronting the bay, is worthy to rank

fied, and is still a favorite resort, especially in the evening, when the bands play. The new hotel is on a site adjoining the Luneta. About seven miles to the south, along the new boulevard, a polo club house has been erected, and the polo grounds are among the finest to be seen anywhere.

The commercial and industrial center of the Filipino capital is called Binondo. It

lies directly across the Pasig from Intramuros, and is a busy place, with its tobacco factories, business houses of the trading companies, and shops. The Escolta, a narrow street that nevertheless seems to be Manila's Broadway, is a most interesting place. Electric cars are whizzing by, and everything suggests American hustling energy, but one is occasionally brought sharply back to the lazy past. There goes a slow-moving carabao hitched to a two-wheeled cart. The driver, a Filipino lad in picturesque red trousers and big straw hat, acts as if time and tide would wait for man indefinitely. At the time of the American occupation these carabaos—water buffalos—were prominent features of Filipino street life. Though they had the habit of knocking off from work whenever a nearby pond or moat proved inviting, their deliberate ways were not objectionable to their equally lazy masters.

Tondo, adjoining Binondo on the north, is the suburb of the poorer classes. When the Americans occupied the islands they found unspeakably bad conditions in the sections occupied by the laborers. Houses were crowded together without any regard for air and light, garbage and waste accumulated in the streets and under the houses, there was no drainage or sewerage system, and drinking water was obtained from infected springs or filthy canals. The accompanying picture gives one an idea of results of the sanitary campaign. The native houses, made of bamboos and grass, are placed far enough apart to give good air and light, and a modern sewage and dumping system takes care of refuse. The people live in clean, wholesome quarters, and have been taught the basic principles of sanitation. The government filled in the disease-breeding sources of water and sunk hundreds of artesian wells, so that there is an abundance of pure water for everyone.

In San Miguel, built on an island formed by an arm of the Pasig, one may see numerous attractive homes of the wealthy class. Their houses would be considered sparsely furnished by the average Westerner, but this sparseness is a concession to the heat. The floors are made of huge strips of rosewood, mahogany and other tropical woods, and are kept in a high state of polish by Filipino "boys." Rugs, draperies, upholstered furniture and bric-a-brac have no place in a Filipino home. Visitors from the Western

world sometimes find that it takes time to appreciate the virtues of a Filipino bed. It has been called various names, including rack, implement of torture and inspirer of insomnia, but it differs from an ordinary bed only in such trifling details as the lack of blankets, springs, mattress and slats. In a climate where man fights a drawn battle with insects, heat and dampness, an American bed would be an absurdity. A Filipino bed, therefore, is a four-poster frame on which is stretched a piece of rattan. The latter is covered with two sheets and the whole is draped with mosquito netting, to protect the occupants from gnats, cockroaches and other undesirable visitors. As the beds are often elaborately carved they have artistic as well as practical value.

One of the most interesting places in the vicinity of Manila is the so-called summer capital—Baguio. Of this wonderful highland region, a mile above the sea, one Manila resident has written: "The heavenly coolness, the sweet pine air and the exquisite scenery give you new life after the years spent in the heat, glare, dust and smells of the lowlands." During the hot season—March, April and May—rich and poor alike hasten to this "Paradise among the pines," where the mean temperature for the warmest month is only 64°, and the thermometer never climbs above 80°. One of the finest highways in the world, the famous Benguet Road, winds in and out among the mountain gorges and permits you to enjoy an unsurpassed motor trip from the lowlands into cloudland. This highway was constructed by the American government at a cost of several million dollars. On the cool plateau a small town has arisen. Besides the buildings which house the government offices, there have been constructed an army post, a government hospital, a great observatory, schools, churches, rest houses, golf links and polo grounds, baseball fields, tennis courts, and many private residences. It takes about eight hours to make the trip from Manila to Baguio, when one travels by train and automobile.

About a day's sail from Manila is another interesting spot, the leper colony on the beautiful island of Culion. Here have been constructed hundreds of concrete houses for the patients, besides a town hall, a school, dining halls, hospitals, stores and warehouses. There are modern lighting, water and sewerage systems, and the inhabitants of the colony

have their own police force. Formerly victims of leprosy were permitted to mingle freely with the non-leprous inhabitants of all the islands, but it is safe to say that the scourge has been conquered even in the provinces where it once raged unchecked. In all, between 8,000 and 10,000 victims of the disease have been sent to Culion, and a few have been completely cured.

Before we say farewell to the delights of the Philippines, it might be profitable to get a bird's-eye view of the archipelago as a whole. There are more than 3,000 islands in the group, but Luzon, on which Manila is situated, and Mindanao have together more area than all the others combined. In fact, the greater part of the total area of the archipelago is condensed into eleven islands. Much has been said about the heat of the region, but this is offset by the sea breezes that blow in between and on the land divisions; another advantage is the fact that the seasons of greatest heat and greatest rainfall are not identical. Beautiful mountains are found on all of the larger islands, some reaching heights of 10,000 feet. Tropical vegetation abounds, and adds to the charm of the scenery. Now that American colonization of the islands has expelled disease, discomfort and barbarism from the greater part of the archipelago, the Philippines ought to become a popular winter resort for Western tourists.

Hawaii, "Paradise of the Pacific." Probably nobody ever undertakes to write of the glories of the Hawaiian Islands without quoting Mark Twain's famous descriptive phrase: "The loveliest fleet of islands that lie anchored in any ocean." Another enthusiastic traveler says, "Conjure up a memory of a perfect May day, when sunshine, soft air and smiling Nature combine to make the heart glad, then multiply that day by three hundred and sixty-five, and the result is a round year of Hawaii. The Hawaiian Islands are semitropical, radiant and beautiful."

Into this land of blue skies and sunshine let us journey in imagination. Five days out of San Francisco the cry is heard, "Diamond Head in sight." This is a point of land sharply projecting into the sea from the island of Oahu, on which the capital city of Honolulu is situated. Diamond Head is four miles southeast of Honolulu, and is over 700 feet in height. At its foot is the world's

most famous beach, Waikiki, where surf riding, boating and bathing are offered with the acme of enjoyment. We eagerly lean over the deck rail as our ship speeds by, and try to make out the lovely villas hidden in the verdure along the shore.

Then, almost before we know it, we are in the little harbor of Honolulu. Surely there has been some mistake! Over a hundred automobiles are parked on the water front awaiting the incoming vessels, and we can see paved streets, electric cars, fine buildings, telegraph poles—in fact, all the unmistakable "earmarks" of a modern city. No, there is no mistake. Honolulu, with over 68,000 inhabitants, is as up-to-date as any other city under the Stars and Stripes, and it is far more beautiful than most American towns of its size. Where else does one find such luxury of vegetation? Walls and verandas are clothed in flowers of every hue, superb palm trees grow everywhere, and one lives constantly in a riot of color and perfume. The private dwellings of Honolulu are not unworthy of their exquisite background. Although the sugar kings are beginning to build mansions as stately as those of Pasadena or Newport, even the less pretentious Hawaiian homes are picturesque and charming. The Hawaiian *lanai* of the better-class residence is well worth special mention. It is a combination of veranda and drawing room, roofed with a trellis, carpeted with mats, and furnished with hammocks, wicker chairs, Chinese lanterns and similar accessories to supreme comfort and enjoyment. To recline and dream in one of these chairs on a balmy day (every day is balmy, for that matter) is the acme of earthly joy to a worn and haggard tourist.

We must not, however, spend too much time day dreaming in a *lanai*. Let us journey to some of the points of interest in this fascinating country. Strangely enough, there is only one good harbor in the Hawaiian archipelago, aside from that in which our steamer docked. That one is Pearl Harbor, about six miles west of Honolulu, and it is well worth inspecting. Imagine a beautiful inland lake, measuring six miles by three, and divided into four landlocked basins by peninsulas and a pretty little island. Before the entrance Nature placed a coral reef, as if to show what she could do in the way of creating a safe and attractive harbor. The United States government, gratefully accept-

ing this ideal site for a naval station, has opened a channel through the reef, and has constructed a huge drydock, barracks, repair shops, hospitals and other structures necessary to a first-class naval base. In the quiet water of Pearl Harbor the entire United States fleet could find safe anchorage.

Another kind of scene greets us at Waikiki Beach. Here, as Mark Twain says, "smoke-dried children clad in nothing but sunshine" sport in the waves, and the air is filled with the merry cries of the surf riders. The natives, who learn to swim before they can talk, ride the breakers on boards, but we who are more timid will try one of those long, narrow canoes. We will not capsize, for our slender craft is protected by heavy outriggers, fixed to the ends of the beams. The boatmen paddle out to a smooth spot in the sea, and there wait for a roller big enough to try the mettle of the crew. At last a mountainlike breaker comes toward us, and soon we are rushing shorewards on its crest, enjoying the swiftest and most exciting "chute the chutes" known to mankind.

Waikiki possesses an aquarium that contains specimens of all the fishes found in Hawaiian waters. They show all the colors of the rainbow and represent an infinite variety of size and shape.

Another interesting excursion is the motor trip to the Pali, a high precipice six miles from Honolulu, at the head of Nuuanu Valley. The panoramic view from the foot of this steep cliff is one never to be forgotten, for there is spread before one's eyes a glory of blue sea, verdant meadows, mountain and valley that cannot be described. The experience is literally a breathless one, for into the gap where the road from Pali begins its descent toward the valley, the trade winds blow with maelstromlike fury. "If you open your mouth too wide, you can't shut it again without getting under the lee of something," is Charles W. Stoddard's comment.

The Hawaiian Islands possess one of the newest and grandest of the great national parks created by the United States government. This one includes in its confines the largest active volcano on the globe—Mauna Loa; the highest peak in the Pacific islands—Mauna Kea, and the world's largest extinct crater—Haleakala. It is impossible to describe the Hawaiian National Park without using superlatives. This is purely a matter of justice. Mauna Loa and Mauna Kea are

both on Hawaii Island, the largest one of the Hawaiian group. It lies about 125 miles south of Honolulu, a comfortable steamship journey away. Passengers bound for Mauna Loa are landed at the port of Hilo, which enjoys the distinction of being the wettest town in the entire archipelago. Situated on the windward side of the island, it is continually being showered by the moisture-laden trade winds, but the showers frequently parade up and down the streets in orderly procession, so that the dry-loving tourist may get out of the rain simply by crossing the street. Mark Twain inquires, "What if the rain sifts down?—the umbrella tree is at hand."

Kilauea, an active crater on the slope of Mauna Loa, is the great show place of the island. It is reached by railroad and automobile, the railroad bringing one within nine miles of Volcano House, where room and board may be had. Kilauea is only 4,000 feet above the sea, as compared with 13,675 for Mauna Loa's summit, but when it is showing off, to use a tourist phrase, it is supremely magnificent. The crater is about eight miles in circumference and is several hundred feet deep. In the center is a pit about 400 feet in diameter, which is reached by a winding trail leading from Volcano House. How near one may approach the pit depends on its degree of activity. A traveler who visited it recently says, "The mass of writhing fluid looks like hell as pictured by old-time fire and brimstone preachers. As floating pieces of lava cool and crack, a series of red hot fountains burst through them, rising to a height of twenty or thirty feet. Out of the awful chasm there arise clouds of sulphur smoke, ever shifting with the constantly changing wind." To enjoy one of the sublimest spectacles afforded man on this planet, one should view Kilauea at night, when its splendor illuminates the whole sky.

The extinct crater of Haleakala is on the island of Maui, twenty-six miles northwest of Hawaii. The mountain rises over 10,000 feet above the sea level, and the trail up its slopes has an average inclination of 500 feet to the mile. Sturdy mountain climbers find it no easy task to make the ascent, but all hardships are forgotten when, at the end of the trail, the magnificent crater meets their view. It is a gigantic hole in the mountain summit—twenty-seven miles in circumference and with sides steeply sloping downward to a

depth of half a mile. Twenty extinct cones are scattered over the floor of the great crater, ranging from forty to one thousand feet in height. A traveler who spent the night in a small rest house on the brink, describes in these words the scene that greeted him at sunrise.

The great crater had filled with clouds during the night. In the gray morning light one could imagine that he was looking over an immense body of water. Clouds had settled around the mountain so that the view of the ocean was shut off. We seemed to be standing on an island with clouds all about us. The first rays of the sun were caught up by the mass of mist in the crater. In an instant the great pit was turned into a sea of fire. Back and forth flashed the light as it was reflected through the abyss of fog. Then as the sun rose the clouds began to take flight, like giant birds, and in a few minutes the crater was empty.

The three islands we have visited—Oahu, Hawaii and Maui—contain large and profitable plantations devoted to the raising of sugar and pineapples. The plantation laborers, made up largely of Japanese, Chinese, Portuguese, Filipinos, pure Hawaiians and

laborers, and one teacher reported that in his school there were fifteen different nationalities. It is interesting, yet a matter of regret, to know that the pure-blood Hawaiians are slowly but surely dying out, and the time is not far distant when the native race will be only a memory. The pure-blood natives are a well built people, fond of athletic sports and of music. Their famous Hula dance, sometimes seen in a degraded form, is also dying out, but occasionally a tourist is fortunate enough to see it in its primitive grace, given by girls clad in dresses of grass and flowers.

The Hawaiian archipelago is a land of many blessings. Its people are whole-hearted in their loyalty to the American government, and even the old Queen Liliuokalani, though unreconciled to the loss of her throne, flew the Stars and Stripes from her palace when she heard that the United States had entered the great war. It is hard to leave these islands of peace and beauty, but we know that they will remain on guard in the Pacific, and welcome us again sometime in the days to come.

Among the Lesser Antilles. A week's steamer journey southeast from New York brings you into the heart of a chain of small islands that dot the Atlantic from Porto Rico to the South American coast. They are not nearly so well known as Cuba, Porto Rico, Haiti or Jamaica, their greater sisters of the West Indies, but they have a charm and picturesque beauty that lift them far above the commonplace. At the northern tip of this necklace of summer isles lies the group that appeared on all maps made before 1917 as the Danish West Indies. On March 31, 1917, the Danish flag floating on the flagstaff at Charlotte Amalie, island of Saint Thomas, was hauled down, and the Stars and Stripes were run up in its place. On that date the Danish West Indies became officially the Virgin Islands of the United States, and in visiting them we are viewing the newest possessions of the great American republic. To acquire them the United States paid Denmark the sum of \$25,000,000.

Although there are fifty islands, all told, in the group, only three are large enough to be known by name to the outside world. These are Saint Thomas, Saint John and Saint Croix. Saint Thomas, our first landing place, is an island of green hills. As we sail into the magnificent harbor of Charlotte Amalie,



A HULA GIRL

mixed Hawaiians, enjoy steady wages, good housing and sanitary conditions. The filth, misery and poverty of the Far East are unknown in Hawaiian country districts. Schools have been established for the children of the

the only port on the island, we are treated to a charming picture. The town climbs upward from the shore on three hills, and its white houses with their red roofs make a pretty patch of color under the blue sky. A huge drydock and coaling docks remind us that Saint Thomas will be of great value to the United States as a coaling station, especially for ships bound for the Panama Canal.

All of the people, white and black, are hospitable and courteous, and it is pleasant to find everyone able to speak English. The little town is delightfully clean, and it has a restful atmosphere that is very soothing. The one straight street runs east and west along the waterfront, and here one may buy the typical products of the island, such as cigars, bay rum, Panama hats and fruits and vegetables. A tiny park with trees and flowers lies near the dock, and not far away is an old-fashioned fort. Side streets branch off



A BELLE OF GUADELOUPE

from the main street and make their way up the steep hills. Occasional flights of stairs aid the traveler in his journey up the hills, and we forget the hardships of climbing when we look out over the harbor, town, and

island-dotted sea. Forty miles to the west the hills of Porto Rico rise hazily in the air, and four miles to the east lies the forest-covered neighboring island of Saint John.

It does not take long to explore Saint John. It is only eight miles long by four miles wide, and its largest settlement, at Cruz Bay, contains fewer than 200 inhabitants. Nearly all of the people on the island are of the black race. This modest islet, however, is the source of over half the bay rum produced in the world; its forests of bay trees are the most extensive of any in the West Indies. Sailing southward from Saint John, we pass a chain of tiny islands, lonely places that are seldom visited, but which are very pretty to look at from a steamer deck.

Then after a voyage of about forty miles, we reach the largest of the Virgin Islands—Saint Croix. It is one of the loveliest gems of the summer seas, and is so green that many call it the "Garden of the West Indies." Before our steamer anchors we can see its great fields of sugar cane, filling up the lowlands and traveling up the hills, while the shining beaches, and the coves with their fringes of palms, give an added touch of beauty.

There are two good-sized towns on Saint Croix—Frederiksted, at the west end of the island, and Christiansted, fifteen miles away at the east end. Frederiksted has a population of 3,000 and Christiansted of about 4,500, but the former town does about four-fifths of the export and import business of the island, because it has the better harbor. Both towns have a clean, well-kept appearance, and the private dwellings, in Spanish-American style, are cool and pretty. To appreciate the beauty of Saint Croix one should journey by motor over its fine roads. An excellent highway leads from Frederiksted to Christiansted, and there are others which follow the coast or wind in and out among the hills.

Saint Kitts, our next stopping place, lying about ninety miles east of Saint Croix, is one of the British Leeward Islands. Across the center of this palm-fringed isle a volcanic range stretches, the highest peak of which, Mount Misery, is nearly 4,000 feet above the sea. The aspect of the island seems far out of keeping with the gloomy name of this slumbering volcano, for wherever one looks the eye meets groves of palm and fields of sugar cane.

The capital and port of Saint Kitts is a charming town called Basseterre, which lies at the foot of a high, rounded hill. The streets and buildings of the business section are grouped about an open space called the Circus, which is encircled by regal-looking palms. Beyond are the dwelling houses, in a setting of tropical vegetation that is brilliant beyond description. Flowers of countless colors and enchanting fragrance grow in riotous profusion, and the royal palms sway everywhere in the sunny air.

There are excellent roads throughout the island, and carriages and motors in number invite you to explore this beautiful land at your ease. One of the most interesting trips is the ascent of Mount Misery. From Sandy Point, at the northern end of the island, the land gradually slopes upward to the mountain, and the Point is a good starting place. After riding for about eight miles we begin to climb the slopes on foot. Forests of great trees are all about us, and their dense foliage offers welcome shade. We see here specimens of the famous orchids of the tropics, which fasten themselves on the forest trees and obtain nourishment from the air. As we go higher we reach a zone of mountain palms and giant tree ferns, and finally reach the great crater itself.

The cavity is nearly a thousand feet deep, and as the trail goes down its steep sides, we may explore it if we desire. Through the cracks in the crater steam issues, which shows that the volcano is alive, though sleeping, but there has never been an eruption within the memory of man. Before we make the descent from the crater we must refresh ourselves with a look at the entrancing view spread out before us. The distant islands seem like tiny gems set in a sea of rippling sapphire, and the country below is magnificent in its garments of soft green.

Five miles to the south lies Nevis, called the "Gorgeous Isle" in the days when wealthy Europeans journeyed there to enjoy its superb climate and beautiful scenery. Alexander Hamilton was born on Nevis, and the ruins of his home may still be seen. On the same island Lord Nelson and the widow Nisbet were united in marriage, in the year 1787. The days of its glory are all in the past, however, for since the abolition of slavery the island has suffered a great industrial decline. Much of the same condition prevails in the attractive isle of Montserrat, about

forty-five miles to the southeast, but we find a different atmosphere when we reach Guadeloupe, one of the French West Indies.

This island is much larger than all of the American Virgin Islands combined, and is, in reality, two islands separated by a narrow creek. The northern and western portion, called Basseterre, is volcanic and mountainous, while the other part, Grandeterre, is low and fertile. Point-à-Pitre, in Grandeterre, is the port and chief commercial center of the island. Here one sees French West Indian life in all its gayety and animation; the gaudy dress of the natives and their brightly colored houses form a picture that seems quite in keeping with Nature's display of color in this tropical land. The city of Basseterre, on the other side of the island, is the seat of government, and may be reached from Point-à-Pitre by automobile.

Dominica, the largest of the British Leeward Islands, is next in our path. It is a land of superb mountain scenery, and its highest peak—Monte Diablotin—is the loftiest summit in the Lesser Antilles. The inhabitants of Dominica are an unusual people; all but about one hundred of the 30,000 living there are of the black race, but they are thrifty, intelligent and courteous, and many blacks of the wealthy class are university bred. Their loyalty to the mother country was demonstrated during the great war, when they contributed money for the construction of two military aeroplanes. Among the Dominicans there are a few pure-blood Caribs, the original natives of the West Indies.

A score of miles from Dominica is the French island of Martinique, forever memorable as the birthplace of Josephine, wife of Napoleon, and as the scene of the eruption of Mont Pelee (1902). Since the destruction of Saint Pierre, until 1902 the most important town on the island, Fort de France has been the leading city. Fort de France is French in architecture and in atmosphere, and one sees here the same attractive costumes noticed in Guadeloupe. Martinique, like its sister islands, is notable for its verdure, and lovely scenery, and its beauties may be enjoyed by means of motor trips over the splendid roads.

Sailing southward from Martinique for about twenty miles we reach British Saint Lucia, called the "Gibraltar of the West Indies." Castries, the port of the island, lies back of a harbor whose narrow entrance

is well fortified. This place is one of England's great coaling stations, and it is an interesting sight to see the negro girls and women carrying baskets of coal on their heads to the ships. Even with this primitive method, ships can be supplied at the rate of 150 tons an hour.

We are now well on our way to the South American coast. Beyond Saint Lucia lie Barbados, called "Little England" by its people; Saint Vincent, the "cradle of tropical agriculture;" the little islets known as the Grenadines; Grenada, last of the Caribbean islands; and Trinidad, England's largest West Indian possession with the exception of Jamaica.

Trinidad is only six miles east of the coast of Venezuela, whose rugged headlands, as we view them from a distance, seem to blend with the hills and mountains of the island, and form an unbroken line. We slip through a narrow channel and enter the great landlocked Gulf of Paria, anchoring at last off the city of Port of Spain, Trinidad's capital. This city represents modern progress and prosperity, for it is as well built and up-to-date as any town of its size on the American continent. Here we find handsome office and bank buildings, modern, well-stocked stores, wide, clean streets, beautiful parks and attractive dwelling houses, while the waterfront is lined with great docks, railway yards and warehouses. All of the streets are paved with asphalt, as are the splendid roads and highways that thread their way through the island, for Trinidad possesses in Pitch Lake the greatest source of asphalt in the world.

There are any number of interesting trips out of Port of Spain. The journey by rail and steamer to Pitch Lake affords one opportunity to see the industrial development of the island, and all of the famous beauty spots can be reached by railway, automobile or steamer. One of the loveliest bits of scenery is the Maraccas Waterfall, fourteen miles from the city. The water, which has a fall of 350 feet, plunges over a steep wall of rock set in an exquisite background of ferns and flowers. South America, whose shores lie so invitingly near, is easily reached from the island. All of the main ports on the northern coast of the continent have steamship connection with Port of Spain and comfortable traveling is always assured in normal times.

A trip through the Lesser Antilles is one of unceasing interest and pleasure. The islands lie in a region of perpetual summer. They have tropical vegetation unsurpassed in beauty and variety, and scenery as entrancing as any on the globe. In these islands one may see strange customs, meet interesting people, and learn what no book can ever teach.

TRAVERSE CITY, MICH., the county seat of Grand Traverse County, 145 miles north of Grand Rapids, on the west arm of Grand Traverse Bay and on the Pere Marquette, the Grand Rapids & Indiana, the Manistee & Northeastern, and the Traverse City, Leelanau & Northern railroads. It has an attractive situation; there is good fishing in the vicinity, and the city is a summer resort. It is in an agricultural and fruit-growing region, noted for its cherry production. The chief industrial establishment is an oval wooden dish factory. Baskets, farm implements, leather and foundry and machine shop products are also made. A county normal and the Northern Michigan Insane Asylum are located here, and the city has a Carnegie Library and a Federal building. The place was settled about 1850, and was chartered as a city in 1895. It adopted the commission form of government in 1913. Population, 1910, 12,172; in 1920, 10,925 a loss of 10 per cent.

TRAVERTINE, *trav'ur tin*, a white limestone, usually hard and partially crystallized, deposited from the water of springs holding carbonate of lime in solution. Travertine is abundant in different parts of Italy, and many of the finest buildings of ancient and modern Rome are built of this stone.

TRAWLING, a mode of deep-sea fishing. The trawl is a triangular purse-shaped net about seventy feet long, which is dragged along the bottom of the sea. The mouth of the net, about forty feet wide, is kept open by a wooden beam. Trawling is possible only on a smooth, sandy ocean floor, as a rough sea bed would destroy the nets. Vessels specially built for this kind of fishing are called trawlers. Trawling is not allowed near the shore. Cod, whiting and other whitefish are taken in large numbers by trawling, and some kinds of flatfish, as soles, can scarcely be caught in any other way. See FISHERIES.

TREADMILL, *tred'mill*, a device formerly used in European prisons by convicts sentenced to hard labor. It consisted of a cylin-

der with steps around its circumference on which the operator was placed. The weight of the body set the apparatus in revolution, and to maintain a footing the operator was forced to keep up a running gait, while his body remained stationary, keeping in balance by means of a handrail. An endless band attached to machinery conveyed the power it produced. The exercise was severe and with the development of the more humane penology, the last of the treadmills was abolished early in the twentieth century. Another form of treadmill has been used to operate farm machinery, the power being supplied by horses, dogs or other animals.

TREASON, *tre'z'n*, that crime which is directly committed against the supreme authority of the state, everywhere considered the most heinous of crimes. In a monarchy it is the betraying or the forfeiting of allegiance to the monarch. In a republic, such as the United States, where the people as a community, and not any one individual are sovereign, treason is necessarily confined to levying war against the state, or adhering to and giving aid and comfort to the enemy. The classic example of treason in United States history is the case of Benedict Arnold (which see).

TREASURY DEPARTMENT, the department of the United States government which has control of all the national revenues and expenditures, was established in 1846 under the name of the *Independent Treasury*. It is the most complex and extensive of all the departments of government, and ranks next to the Department of State. As first established the department consisted of the Secretary of the Treasury, a comptroller, an auditor, a treasurer, a register, an assistant secretary and a clerical force. From this small beginning the department has expanded until it now includes branches in all the principal cities, and has over 5,000 employes in its service at Washington and many others in the various branches.

The Treasury Department collects all taxes levied by Congress, including income taxes, duties on imports and internal revenue taxes. It has charge of the minting of all coins and the printing of all paper money, postage stamps and other stamps issued by the government, and of all bonds and other certificates of indebtedness. It disburses all moneys collected, according to appropriations made by Congress. It has oversight

over all National and Federal reserve banks, and protects the people against counterfeiters and smugglers. It also has charge of the construction and maintenance of all United States government buildings in the country, and the general control and auditing of the accounts of the other executive departments.

Secretary of the Treasury. The Secretary of the Treasury is the chief officer of the department. He is a member of the President's Cabinet and is next to the Secretary of State in line of succession to the Presidency. His salary is \$12,000 a year. Many of the most noted men in American history have filled the position of Secretary of the Treasury, among them Alexander Hamilton, Albert Gallatin, Alexander J. Dallas, William H. Crawford, Roger B. Taney, Salmon P. Chase and John Sherman.



The Secretary is aided by three assistant secretaries, but the chief officer next to the Secretary is the *Comptroller of the Currency*, who has general supervision over the auditors and countersigns all orders for the payment of money. No money can be paid out of the Treasury without his approval. The Comptroller is assisted by six auditors, who are assigned respectively to the other executive departments. The *Treasurer of the United States* is responsible for the care and disbursement of all the money belonging to the United States, and he signs all paper money issued by the government. The *Director of the Mint* has charge of the coining of money in the various mints, and the *Commissioner of Internal Revenue* has charge of the collection of all revenue fees, including income taxes.

TREATY, *tree'ty*, an agreement, league or contract between two or more nations or sovereigns, formally signed by commissioners properly authorized, and ratified by the several sovereigns, or the supreme power of each State. Treaties are of various kinds, as *commercial treaties*, *treaties of alliance*, offensive and defensive, and *treaties of peace*. In most monarchies the power of making and ratifying treaties is vested in the sovereign; in the United States it is vested in the President and the Senate, the former conducting the negotiations, the latter ratifying the completed treaty.

TREATY OF VERSAILLES. See VERSAILLES, TREATY OF.

TREB'IZOND, TURKEY, situated on the Black Sea, 575 miles east of Constantinople.

The city occupies a plateau and is enclosed by walls erected during the Middle Ages. It contains a number of ruins of ancient structures, among them those of an old castle and several old Greek churches, which have been transformed into mosques. In general, the dwellings are low, one-story buildings. The city contains numerous bazaars and is the seat of an extensive commerce, though the harbor is poor. Population, about 55,000.

TREBLE, in music, the highest vocal or instrumental part in a harmonized musical composition, sung by women or boys or played by instruments of acute tone, as the violin, the flute, the oboe or the clarinet, or on the higher keys of the piano or organ. The *treble clef*  is a sign used at the beginning of  written music to indicate the treble staff. See MUSIC.

TREE, the common name of one of the most important groups of plants. "Next to the earth itself," writes Gifford Pinchot, "the forest is the most useful servant of man. Not only does it sustain and beautify the land, but it also supplies wood, the most widely used of all materials. Its uses are numberless and the demands which are made upon it by mankind are numberless also." Trees have certain characteristics that separate them from other kinds of plants. Unlike herbs, they develop a hard, woody tissue, and instead of dying at the end of the growing season, as is true of many herbs, they live on indefinitely from year to year. Trees differ from shrubs, which grow as vines or bushes, in that the tree stem emerges from the soil a single structure. Branches never are borne close to the ground, as in case of shrubs. Trees are also distinguished from shrubs and herbs in size. In general, trees vary in height from twenty-five to 300 or 400 feet. There are, however, certain trees under twenty-five feet, especially among the fruits. These are called *dwarfs*, and their undersize is usually the result of pruning.

Parts of a Tree. Trees grow from extended root systems. The roots are found deep in the earth, and they spread out over a large area, in case of large trees, for they not only must gather food from the soil, but must be strong enough to serve as a sure foundation. The woody stem, or part that grows above the soil, is called the *trunk*, or *bole*. There are two classes of boles, represented by those of the pine and the elm. The former tree sends



THE TREE

BY JOYCE KILMER

Who Gave His Life in
the World War

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth
is pressed
Against the earth's sweet
flowing breast.

A tree that looks at God all
day
And lifts her leafy arms to
pray;

A tree that may in summer
wear
A nest of robins in her hair;

Upon whose bosom snow has
lain;
Who intimately lives with
rain

Poems are made by fools
like me,
But only God can make a
tree.



up a tall, undivided trunk; the latter has a bole which divides into branches. These types are illustrated in the section *Winter Study of Trees*, below (see Fig. 1 and Fig. 2). The upper part of the tree, that including branches and foliage, is called the *crown*.

Lessons on Trees.

Notwithstanding the value and usefulness of the forests, people have been exceedingly prodigal of them, and millions of acres of forests which should have been preserved for future generations have been ruthlessly destroyed. All too late they are beginning to realize the damage done, and both state and national governments are taking strenuous measures to protect the forests that remain, and to secure reforestation of some of the regions from which the forests have been removed. The school can and should do much toward assisting this movement in each locality.

General Suggestions. 1. Thousands of young trees are destroyed every year through

thoughtlessness. Children as well as adults engage in this destruction. Attention, therefore, should frequently be called to the importance of preserving and caring for these trees.

2. Success in securing the children's interest in caring for trees will depend upon the teacher's ability to secure the interest of each child in some particular tree. A good way to do this is to ask each pupil old enough to engage in the work at the beginning of the fall term to select a tree which he may call his tree for the year. The tree chosen may be in the schoolyard, by the roadside, near the child's home or in any other place where it can be frequently seen.

3. From the study of this particular tree lead each child to study trees in general. The first lessons in the fall should have this end in view.

4. Observations upon which the study of trees may be based require time. It is not wise to give lessons upon this subject daily. Usually one lesson a week is all that should

Fall Study of Trees. *Preparations for Winter.* In the study of natural objects it is wise to begin with the study of conditions that prevail at the time that the lessons are given. This is particularly necessary in the study of trees.

Call attention to the autumn tints as they gradually appear.

Ask the children to collect and bring to school leaves of different colors. How many different kinds of trees are represented in the collection?

Do all leaves from the same sort of trees have the same color or varying shades of that color?

What is the prevailing color of the leaves of the oak? Of the maple? Of the beech? Of the sumac?

Can you tell the sorts of trees in a forest by the color of the leaves in the autumn?

If the trees to which attention is called in the above paragraph are not common to the locality, those that are common should be selected and they will answer equally well.



FIGURE 1

be attempted. More may be given if the time at the teacher's disposal and the ability of the class warrant, but in all cases the pupils should be given opportunity to prove by their own observations the facts discussed in the lesson.



FIGURE 2

The answers to the last question cannot be given offhand, but by frequent observation the children will be able in time to judge quite accurately the prevailing species of trees in any woods from the general appearance of the leaves in autumn.

Some Causes and Effects. Another question which will require thought is: Why do the leaves change color, wither and fall? Of course, only the older pupils can pursue this line of thought very far, and it may be well to let it stand before the class through the entire season, as they follow the putting forth of the leaves and blossoms and the developing and ripening of the fruit.

Do all trees shed their leaves in winter?

What trees in your locality do not?

Discussion of these facts will enable you to divide the trees into those which shed their leaves, or deciduous trees, and those which do not shed their leaves, or non-deciduous or evergreen trees. It will be interesting to have the class compare the kinds of leaves from the two classes of trees.

Of what advantage is it to the deciduous trees not to have leaves in winter?

Winter Study of Trees. Several lessons can be devoted to plans of branching. When the trees are free from leaves these plans can be easily seen. Two general plans of branching are found; one, in which the trunk extends through the crown to the highest point in the tree, as in Figure 1. The pine and the beech are familiar examples of trees having this plan of branching.

The second plan is seen when the trunk divides into a number of large branches, from each of which other branches extend, as shown in Figure 2. The elm and the apple are good illustrations. Spend one or two lessons in discussing the relation of these plans of branching to the shape of the tree.

What shaped crowns do the evergreens have?

What shaped crown does the elm have?

The Arrangement of Buds and Branches. Ask the children to study the arrangement of branches on the evergreens. A pine, spruce or balsam will answer the purpose. They will discover that the branches are arranged around the trunk in whorls.

What does this arrangement have to do with the shape of the tree?

Have the pupils bring to school small branches from the elm, the maple, the apple tree and cottonwood. Other trees common in the locality will answer as well. Perform the following experiment with the branch from each tree. Stick a pin in the bud near the lowest end of the branch. Fasten a white thread to this pin, extend this thread to the next bud, then to the next, and so on, winding

it around the branch as may be necessary to reach each successive bud. Continue until a bud practically over the first is reached.

How many buds were passed?

How many times did you wind the string around the branch?

The answers to these questions will vary with the different branches, and the experiments will reveal the following facts: first, that on some trees the branches appear opposite each other; secondly, that on most trees the branches appear on alternate sides of the stem; thirdly, that this alternate arrangement varies in different species of trees.

Study of Structure of Buds. The same branches may be used for this purpose. If placed in water for a few days, in a warm room, the buds will swell and their parts can be easily seen.

What is the purpose of the scales and of the gumlike substance found on some buds?

If possible, procure some buds from the horse chestnut. What is the purpose of the cottonlike substance in these buds?

Study of the Bark and Wood. Have some pupil procure a section of the branch at least one inch in diameter. A large branch is better. The section should be at least six inches long. First study its external appearance.

What is the color of the bark?

Examine the end of the branch. From this, how many layers of bark can you discover?

How are the layers of wood arranged?

What is the dark portion in the center?

Split the branch through the center. Smooth the surfaces with a plane or sharp knife. From the study of these surfaces, how many layers of bark do you discover?

If you have an opportunity to secure a section of the trunk of a tree, six inches or more in diameter, you can teach the pupils to pursue their studies still further. Saw one end of the section off with a fine saw, then smooth the surface with a draw knife or plane. When this is done, ask the pupils to note and count the rings or layers of wood, showing that each layer represents a year's growth. How old is the tree? Split the section through the center and smooth

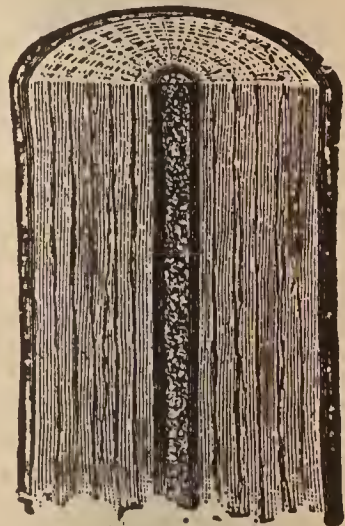


FIG. 3
SECTION OF A
BRANCH

and examine the surface of one piece. Can the annual growth be traced on this surface? These sections make very fine cabinet specimens, and where they can be obtained without destroying the tree for the purpose may



FIGURE 4

be preferred to the specimens which are described a little later in this article.

How many kinds of wood are there in the branch?

How do these kinds of wood compare with each other in color?

Following these exercises, ask the children how many trees they know by the appear-

diameter and may be cut in the form shown in Figure 3, or one end may be slanting. The specimens should be sound and thoroughly dried, and then the exposed surfaces should be smoothed and oiled or varnished, so as to bring out the coloring and graining of the wood. In the spring and summer leaves of these trees may be pressed and the flowers and fruit gathered and mounted. If these are placed on stiff cardboard the card can be put in the cabinet back of the specimen showing the kind of wood. Thus there is a complete exhibit of each tree in the locality.

Spring and Summer Studies. *Early Blossoms and Fruit.* Ask the class to watch the trees in the spring and notice which ones put forth their blossoms before the leaves appear. Samples of these different blossoms should be gathered and brought to class for study. Blossoms are small and it is not wise to attempt to study their different parts at this time. The chief thing is to notice the different forms. Good trees and shrubs to compare are the soft, or red, maple and the willow, as the two typical forms of blossoms are produced by these trees. Ask the pupils to follow the



FIGURE 5

ance of the bark. It is well for each to make a list of the trees he can recognize in this way.

A very pleasant and valuable exercise connected with the study of trees is the beginning of a school cabinet of native woods. The specimens should be at least four inches in

development of the seeds on these trees and to notice also the way in which the seeds are scattered.

How soon do the maple seeds germinate?

Study of Leaves. Ask the class to observe what trees put forth their leaves first.

Which ones put forth their leaves next?

Which are the last?

When the leaves are fully developed, ask the children to bring leaves from the elm, maple and oak. Compare these in size, form and structure. This comparison will show that leaves of deciduous trees are constructed on two general plans: first, the plan having one large rib known as the midrib and seemingly the extension of the leaf stalk, extending through the leaf from the base to the apex, as illustrated in Figure 4, which shows the leaf and blossom of the elm. The second plan shows several large veins or ribs radiating from the end of the leaf stalk, as shown in Figure 5, which is an illustration of the maple leaf. After these plans have been studied, pupils should be asked to find as many different trees and shrubs as they can, having these different sorts of leaves. They will discover in their search that the shape of the leaf in all cases depends upon its plan of veining, or the arrangement of the large veins or ribs.

Some trees do not produce their fruit early in the season. This is particularly true of those that bear nuts, such as the oak, beech and hickory. Children should be encouraged to watch these develop through the summer and to gather specimens of fruit as soon as they are ripe. These specimens will furnish material for lessons next fall.

Planting Trees. The great purpose of lessons on trees should be to secure such an interest in them on the part of the children that they will want to care for those about the school and their homes, and that they will also want to increase the number by planting others. This may be done in one of two ways: first, by planting the seeds of the trees; second, by transplanting the trees taken from localities where they are not needed.

The children will be greatly interested in planting seeds of trees, such as the seed of the maple. If there is a school garden a small section may be set apart for this purpose. The soil should be made mellow to the depth of twelve to fourteen inches and the seeds placed in it with only a slight covering of earth, the general rule being to make the covering equal in depth to the diameter of the seed. If these seeds cannot be planted in the school grounds they can be planted in flower pots or boxes. After planting, the soil should be thoroughly wet and be kept reasonably moist until the seeds germinate. It is interesting to care for these young plants

through the season and notice how fast they grow. If carefully protected from injury, the second year they will grow still more rapidly and in a short time become large enough to transplant. Children who watch the growth of trees from the seed in this way become acquainted with their appearance and from this knowledge are able to protect thousands of young trees which are destroyed through ignorance.

Teachers should thoroughly understand transplanting of trees and be able to give practical lessons on it. This can usually be done most successfully by directing the pupils in planting one or more trees in the schoolyard. Most arbor day manuals contain specific directions for this work. However, the following points, taken from "Farmers' Bulletin No. 134, United States Department of Agriculture," are so plain and practical that they are here reproduced for the benefit of those who wish more extended directions than are usually found in the manuals. This bulletin is excellent authority and those who carefully follow directions here given may feel sure of success.

How to Plant Trees

Preparation of the Soil. Thorough preparation of the soil should precede the planting. Where blocks or belts are to be formed, the ground should be plowed and prepared as for a garden crop. Clay soils are best plowed the previous fall, in order that the ground may weather over winter. On such soil subsoiling is beneficial, and should precede the planting by at least one season. Just before planting time the ground should be pulverized with a roller or harrow. If the planting is to be done in rows, the ground should be marked off lengthwise and crosswise and the trees set at the intersections. It is sometimes desirable to mark off the ground only one way and run furrows the other. In arid regions the furrows may be deepened into trenches, so that rain water which falls on the surrounding ground may be drained to the tree. On the other hand, in regions having a copious rainfall it will frequently be necessary to plant the trees on a raised portion or mound of earth in order to keep the soil dry enough for them to thrive. The holes should be dug large enough to contain all the roots fully spread out, and deep enough to allow the tree to stand about three inches lower than it grew as a seedling. It then should flourish.

Time and Manner of Planting. South of the thirty-seventh parallel, fall planting is safe and often advantageous. North of this, spring planting should be the rule, as fall-planted trees can scarcely develop sufficient roots to sustain themselves during the winter. The most successful nurserymen practice early planting for deciduous trees, beginning operations as soon as the ground ceases freezing. Evergreens are not planted until later; some even wait until the young growth is starting. If possible, planting should be done on a cool, cloudy day. Unless the day is very moist, the trees should be carried to the planting site in a barrel half filled with water, or a thin mixture of earth and water, and lifted out only as they are wanted. Even a minute's exposure to dry air will injure the delicate roots—the feeders of the tree.

The roots should be extended in their natural positions and carefully packed in fine loam soil. It is a good practice to work the soil about each root separately and pack it solid with the foot. As the hole is filled, the earth should be compacted above the roots and around the stem, in order to hold the tree firmly in place. The last two inches of soil should be very fine, and should lie perfectly loose. It will serve as a mulch to retain the moisture.

Trees should be planted neither in very wet nor in very dry soil. If the soil is wet, it is better to wait until it is drier. On the other hand, if good cultivation has been maintained the year previous to planting, the soil is not likely to be so dry that trees will not start. Besides insuring a supply of moisture, such cultivation puts the ground in good physical condition for planting.

With this treatment, watering will scarcely ever be necessary. If it is, the holes may be dug a few days beforehand and filled with water. They should be refilled as the water soaks away until the soil is fully moistened. A thorough irrigation, when that is possible, is still better. As soon as the soil becomes somewhat dry the trees should be planted. While it is a common custom to water at the time of planting, those who do no watering are usually the most successful. Even in the semi-arid regions some successful growers apply no water, but keep up an excellent system of cultivation, thereby retaining the soil moisture.

The spacing of the trees is not so important in school-ground planting as in forest

plantations, yet it is worth consideration. The trees should not stand so near together as to produce long, slender poles; on the contrary, short, thick trunks are desirable, to support large tops and withstand heavy winds. From 8 to 12 feet apart will be suitable spacing distance. Where large blocks are to be planted the trees may be closer, but it is scarcely ever desirable to plant them closer than 6 by 6 feet.

Why Trees Die in Transplanting. To many persons it is a mystery why trees die after being transplanted. They do not die without cause, however, and when one begins to wither something is wrong. Oftentimes the result is not to be noticed until weeks after the injury; in other cases it is apparent in a few days. After the injury has been done it can be overcome only by the subsequent growth of the tree. All the assistance that can be given is to make the surroundings of the tree favorable for growth. The following are some of the causes of death among transplanted trees:

Loss of Roots. The loss of the principal part of its root system when the tree is being taken up is a great shock to its vitality, and frequently causes its death. A very large part of the roots must be cut off, for usually the space surrounding the tree is filled with fibrous rootlets, myriads of which can scarcely be detected with the naked eye. Almost all of these are lost, as well as many of the larger roots. Mr. D. C. Burson, of Topeka, Kan., last year dug up and measured as much as he could of the root system of a vigorous Hardy Catalpa seedling that had grown from May till November. This six-months-old seedling showed over 250 feet of root growth. By the methods in common use only a fifth, or perhaps as little as a tenth, of the root is taken up with the tree in transplanting. Such loss throws the root out of balance with the top. If the top is not shortened, or in some way protected, the leaves may evaporate more moisture than the roots can provide, resulting in the death of the tree.

Exposure Before Planting. With proper subsequent treatment a tree can endure the loss of many roots, but instead of the needed protection it often gets much unnecessary exposure to sun and dry air. This may be in digging, packing, shipping, unpacking, or any other of the various handlings which it undergoes between its removal from the ground and subsequent planting. On a warm

day in March the writer saw a bundle of trees in shipment across the plains of Texas without the slightest covering. Before the destination was reached the roots became withered and almost dry, having suffered a hundred times more exposure than the ordinary tree can stand without injury. Not many persons would be guilty of such gross neglect, but the fact remains that exposure causes the death of more trees in transplanting than any other single cause. Exposure can usually be easily prevented, and no one who persists in neglectful practices can hope to be successful.

Failure to Plant Well. The failure to pack the soil tightly about the roots is a common error in planting. It causes injury in two ways: It leaves the tree unstable, to be rocked to and fro or even blown down by the wind; it also prevents the first growth of rootlets from absorbing food. This they cannot do unless good, fine soil is firmly packed around them. Clods will not pack snugly. Likewise manure or litter of any kind mixed with the soil may prevent firm packing. Anything that prevents the soil particles from coming into close contact with the roots is sure to be injurious. Another error is in shallow planting. This allows wind and water to lay bare the roots, and in a short time the tree dies. Crowding the roots into too small a hole is a similar difficulty. Such errors are more often due to lack of experience and skill than to haste. The unskilful planter will hardly plant well, however slowly he may go.

Wet Soil. Trees are often injured by being planted in wet soil. Whether the excessive moisture is a permanent or a temporary condition is likely to make little difference in the results. If it is permanent the water prevents the air from reaching the roots, while if it is only temporary the trampling of the soil over them causes it to stick together so that on drying it becomes baked, leaving them impacted in a hard lump of earth which excludes the air. Excessive air currents in the soil cause injury by drying the roots, but a constant permeation of the soil by the air is necessary to supply oxygen. This process is precluded by either the saturation or the baking of the soil. Undrained pockets occur here and there even in well-drained fields, and are always difficult to deal with in tree growing. Careful investigation before planting is very desirable.

When We Plant a Tree

HENRY ABBEY

What do we plant when we plant the tree?

We plant the ship which will cross the sea;

We plant the mast to carry the sails;

We plant the plank to withstand the gales,

The keel, the keelson, the beam, the knee:

We plant the ship when we plant the tree.

What do we plant when we plant the tree?

We plant the houses for you and me;

We plant the rafters, the shingles, the floors;

We plant the studding, the lath, the doors,

The beams, the siding, all parts that be:

We plant the house when we plant the tree.

What do we plant when we plant the tree?

A thousand things that we daily see;

We plant the spire that out-towers the crag;

We plant the staff for our country's flag;

We plant the shade from the hot sun free—

We plant all these when we plant the tree.

Drying Out of the Soil. Another cause of death is the drying out of the soil. Summer droughts are not unknown in any part of the country, and are very frequent in parts of the Mississippi Valley and on the Plains. Occasionally they are so intense and long continued that it is difficult to make recent transplanted trees survive, even when carefully planted and cultivated. In such a time, those which are poorly planted and cultivated are almost sure to die. Frequently, too, weeds and grass grow up in the plantation and draw off the moisture, thereby greatly diminishing the supply for the young trees.

On a school ground there is likelihood of the trees being injured by the trampling of the soil. The pupils will naturally wish

to play among them, and unless they are restrained the soil will soon become compacted. It then dries out very quickly, and in time of drought the trees are sure to suffer and may be killed. By proper care and kindly suggestion, the children can be persuaded to help the tree in its struggle for life by keeping away from it until it is well rooted.

Related Articles: Consult the following titles for additional information:

| | |
|-------------------|-----------------|
| Acacia | Juniper |
| Alder | Laburnum |
| Arbor Vitae | Larch |
| Ash | Laurel |
| Aspen | Leaves |
| Banyan | Locust |
| Basswood | Lumber |
| Bay | Magnolia |
| Beech | Mango |
| Birch | Mangrove |
| Bitternut | Maple |
| Black Gum | Mountain Ash |
| Bottle-Tree | Nettle Tree |
| Box Tree | Nut (with list) |
| Buckthorn | Oak |
| Cabbage Palm | Olive |
| Cacao | Osage Orange |
| Catalpa | Palm |
| Cedar | Palmetto |
| Chestnut | Palmyra Palm |
| Coniferae | Pine |
| Cottonwood | Poplar |
| Cypress | Roots |
| Date | Sago |
| Deciduous Trees | Seeds |
| Doum Palm | Sequoia |
| Elder | Sorrel Tree |
| Elm | Spruce |
| Eucalyptus | Stems |
| Evergreen | Sycamore |
| Fruit (with list) | Tallow Tree |
| Hemlock | Tamarind |
| Hickory | Teak |
| Horse-Chestnut | Tulip Tree |
| Ironwood | Upas |
| Ivory Palm | Willow |
| Judas Tree | Yew |

TREE, HERBERT BEERBOHM, SIR (1853-1917), an English actor and manager, born in London and educated in England and Germany. He made his first appearance on the stage as Grimaldi, at the Globe Theatre, in 1878, and six years later achieved a great success as the Curate in *The Private Secretary*, given at the Prince's. In 1887 he undertook the management of the Comedy Theatre and of the Haymarket. He visited the United States in 1894. His repertoire included *The Merry Wives of Windsor*, *The Pompadour*, *The Dancing Girl*, *Hamlet*, *Trilby* and *John-a-Dreams*. He published *Fallacies of the Modern Stage* and *The Imaginative Faculty*.

TREE FROG, or **TREE TOAD**, which, as the name indicates, lives among the branches of trees, is a link between toads and typical frogs. It has claw-shaped toes, and a further aid to climbing is provided by nature in the flat, sticky cushions on the feet which adhere to smooth surfaces. They are small, shapely, active and of changeable color, and their

notes are loud and piping. They should never be harmed, as they are destroyers of insects.

TRE'FOIL, a genus of plants belonging to the bean family. There are numerous species, all having compound leaves in three divisions, like clover. Bird's-foot trefoil, so called because the pod clusters somewhat resemble a bird's foot, is a plant similar to the Irish shamrock. It grows on the European continent and in the southern part of the United States. The name trefoil is also applied to a small three-part architectural ornament.

TRENT, a river of England, which rises on the northwest border of Staffordshire, flows southeast to Derbyshire, then northeast through Derby, Nottingham and Lincoln, joining the Ouse about fifteen miles west of Hull. The two streams unite to form the Humber. The Derwent, Idle, and Tarn and Soar are its tributaries. The Trent is 170 miles long and is navigable for barges 120 miles. It is connected by canal with the Mersey. Next to the Severn and the Thames, the Trent is the most important river in England.

TRENT, COUNCIL OF, a celebrated ecumenical council of the Roman Catholic Church, convened to settle various controversies that were agitating the Church during the Reformation period and to correct abuses. The Council was called by Pope Paul III, in December, 1545, at Trent, a town in the Austrian Tyrol. The sittings were interrupted by political and religious disturbances, and the work undertaken was not finished until 1563. So thorough were the labors of the Council that the standard of Roman Catholic faith and practice which it set has not been altered to the present day. The only additions have been the statements regarding the Papal Infallibility and the Immaculate Conception.

TRENT AFFAIR, an incident of the American Civil War, important historically as it involved the question of the right of search. In October, 1861, Captain Charles Wilkes, in command of the United States ship *San Jacinto*, intercepted at sea the British mail ship *Trent* and took from it two Confederate commissioners, John Slidell and James M. Mason, who had embarked from Havana and were on their way to France and England to solicit aid for the Confederate cause. The commissioners were

taken to Fort Warren, Boston. The act, though applauded by the North, was in violation of international usage. The *San Jacinto* should have taken the *Trent* as a prize to a port, to be adjudged. President Lincoln and Secretary Seward recognized the impropriety of the act and released the prisoners, with apology to the British government. See MASON, JAMES MURRAY; SLIDELL, JOHN.

TRENT CANAL. See CANALS OF CANADA.

TRENT-ET-QUARANTE, *trahNt ay kahrahNt'*, or **TRENTE-UN**. See ROUGE-ET-NOIR.

TRENTON, N. J., the capital city of the state and the shire-town of Mercer County, situated on the Delaware River, at the head of navigation, on the Delaware and Raritan Canal and on the Pennsylvania, the Baltimore & Ohio, the Delaware, Lackawanna & Western and the Philadelphia & Reading railroads. It is also connected by electric lines with New York, Philadelphia and the principal cities of New Jersey. It is noted for its immense pottery works, for it manufactures more than one-half of all the pottery and china produced in the United States, and for extensive iron works and wire mills. There are also rubber works, furniture factories, watch factories, carriage and wagon works and brick and tile yards.

The city possesses exceptional educational advantages, having the state normal and model school, a school of industrial arts and numerous private and religious academies and business colleges. It has a beautiful public library building containing about 75,000 volumes, and the state library. It is the seat of the state asylum for the insane, the state reformatory, a reformatory home for girls and the state penitentiary. Other conspicuous buildings are the state capitol, the county courthouse, the state armory, the Federal building, the Y. M. C. A. building, the Masonic Temple and the high school building. Cadwallader Park and Spring Lake Park contain many beautiful monuments and drives. Trenton was the scene of a notable engagement in the Revolutionary War (see TRENTON, BATTLE OF). It was first settled in 1676, was incorporated as a borough in 1746, and was made the state capital in 1792. It adopted the commission form of government in 1911. Population, 1910, 96,815; in 1920, 119,289, a gain of 23 per cent.

TRENTON, BATTLE OF, an important battle of the Revolutionary War, fought at Trenton, N. J., the night of December 25, 1776, about a month after Washington had begun his retreat across New Jersey. Pursued by the British, he crossed the swollen Delaware River, on which were floating blocks of ice, on December 8th. Cornwallis then took up his position at Princeton. On the night of the twenty-fifth Washington recrossed the Delaware, marched on Trenton, which was defended by a force of Hessians, surprised them in the midst of their Christmas night carousal, and captured about a thousand. The Americans lost five men—two killed, three wounded. Washington immediately recrossed the river, and soon afterwards fought the famous Battle of Princeton. These successes revived the spirits of Washington's army and practically turned the tide of victory toward the Americans. See PRINCETON, BATTLE OF.

TRENTON, ONT., in Hastings County, at the mouth of the Trent River near the west end of the Bay of the Quinte, 100 miles east of Toronto, with which it has boat connection. It is on two great railway systems, the Canadian National, and the Canadian Pacific railways. Its industries include a foundry, cannery, a silverware factory, grist mill, clothing and button factories, paper mills and canneries. The town is near iron mines and limestone quarries. Population, 1916, about 9,000; in 1921, 5,892.

TRENTON SERIES, an extensive rock formation, forming part of the Ordovician System. The rocks, mainly limestones and carbonaceous shales, are named for Trenton Falls, Central New York, where the largest typical deposits occur. Other localities where they are conspicuous are along the eastern, southern and western borders of the Adirondacks, on the northern shores of Lake Ontario, in the upper Mississippi Valley and in the Rocky Mountains. In Wisconsin and Illinois Trenton rocks contain zinc and lead ores; in Indiana and Ohio they are a source of oil and natural gas. The limestones of this formation are much used for building material and for making lime and Portland cement.

TREPANG', the commercial name for several sea slugs which are an important article of food among the Chinese. The slugs are found chiefly about coral reefs in the Eastern seas, particularly in the Indian Ocean.

in the Eastern Archipelago and on the shores of Australia. The trepang is a repulsive looking animal, with a soft, wormlike body, varying in length from six to twenty-four inches. It is smoked and dried for the market, and is used chiefly to make soups. There is a small trepang industry in California.

TREPHINING, *tre fine' ing*, the operation of cutting a circular opening into the skull, by means of a *trepine*. The operation is made necessary by skull fracture or other injury requiring removal of a particle of bone. It is done with an instrument consisting of a small hollow steel cylinder from half an inch to an inch in diameter, with teeth on its lower edge forming a circular saw. See SURGERY.

TRES'PASS, an offense against the person or property of another, especially an unlawful entry upon property. Injuries committed against land or buildings, as posting advertisements without permission, entering another's house or allowing cattle to stray into his fields, are common forms of trespass. The entry of an officer of the law without the authority of a warrant is a trespass. Redress for trespass is obtained through a suit for damages. A trespass committed by mistake is as actionable as wilful trespass. Continued or threatened trespass may be restrained by injunction.

TRIAL BY BATTLE. See BATTLE, TRIAL BY.

TRIANGLE, a plane figure bounded by three straight lines. Triangles are classified as *equilateral*, *isosceles* and *scalene*, according as they have three sides, two sides or no sides equal. They may be *obtuse*, *acute* or *right-angled*. The side upon which a triangle rests is its *base*; the point of the angle opposite the base is the *vertex*; the distance between the base and the vertex is the *altitude*. In a right triangle the side opposite the right angle is the *hypotenuse*.

It has been known since 500 B. C. that the square on the hypotenuse of a right triangle is equal to the sum of the squares on the other two sides. From this fact any side of a right-angled triangle may be found, if the other two sides are known. The area of a triangle is calculated by multiplying the base by the altitude and dividing by two.

TRIAS'SIC SYSTEM, a group of rocks, extending from the Carboniferous System, below, to the Jurassic, above. It is therefore the oldest formation of the Mesozoic

Era. The rocks are sedimentary, but in many places they are disarranged by the breaking through of volcanic matter, which has formed dikes and cliffs of trap. The Palisades of the Hudson afford a good illustration of such formations. Triassic rocks are generally distributed throughout all continents. In North America they are found on both the Atlantic and Pacific coasts. The sandstone of the Connecticut valley and of New Jersey, so highly prized for building, is of this period; most of the other sandstones of the formation are red and form the group sometimes classified as New Red Sandstone. The plant life was similar to that of the Carboniferous Period. The large quantities of fossils found in the rocks show plainly that vast numbers of gigantic lizard-like animals overran the land and that the seas teemed with other monsters of huge size. The period is often referred to as the Age of Reptiles.

Related Articles. Consult the following titles for additional information:

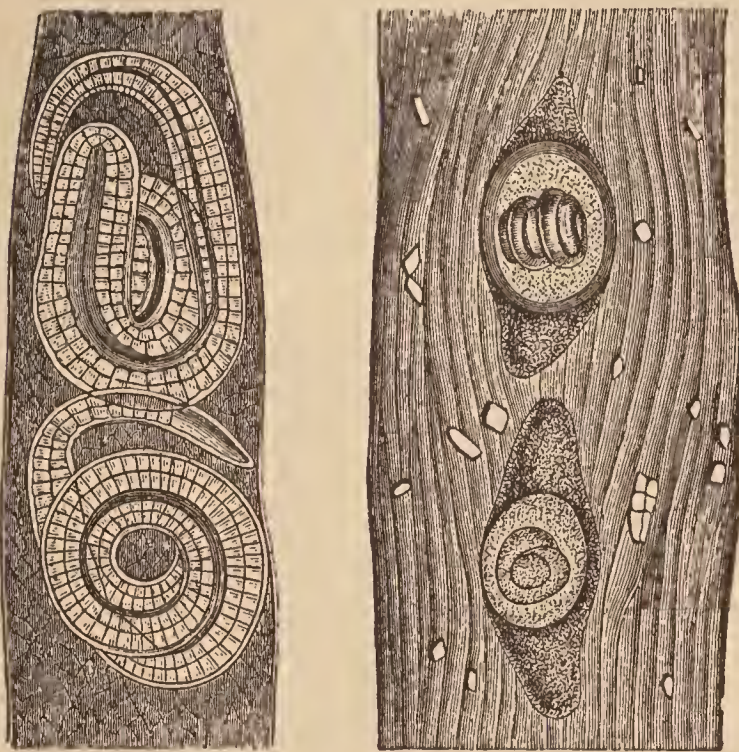
| | |
|----------------------|-------------------|
| Carboniferous System | Mesozoic Era |
| Jurassic System | New Red Sandstone |

TRIB'UNE, from the Latin *tribunus*, in ancient Rome was the name applied to either of two government officials, whose duties were totally different. Originally the tribunes were the commanders of the soldiers furnished to the Roman army by the tribes, and from this the title is doubtless derived. In the time of the Republic the *military tribunes* ranked next to the commander in chief. Under the Empire the office was of less importance.

Far more important than the military tribunes were the *tribunes of the people*. These were magistrates elected to protect the people's rights. The office was instituted in 494 B. C. The tribunes had almost dictatorial powers and in the later years of the Republic they were the leading officers of the state.

TRICHINA, *tre ki' na*, a minute worm, which, when it obtains lodgment in the muscles of man, gives rise to the disease trichiniasis. The worm is found in several of the mammals, especially the pig, and it is generally from the latter that man receives the disease. When flesh containing the larvae, or worms in their resting stage, is taken into the stomach, these soon become developed into adult worms, which pass into the intestines. In the mature state the male is about one-twentieth of an inch long, and the

female is from one-eighth to one-twelfth of an inch in length. The female produces an extraordinary number of embryos, which, by penetrating the mucous coat of the intestine, enter the capillaries and are carried thence into the general circulation; thence they make their way into the muscles, where they rest encased in a limy cyst and give no further trouble. While in their active state, they set up diseased conditions in their host, which often prove fatal. In the illustration, the figure to the right shows larval worms in the encysted state, embedded in the human muscle, and the figure to the left shows trichinae free in the human muscle.



TRICHINAE
Encased and free.

Trichiniasis. This is the disease caused by the passage of the trichina from the intestines to the muscles. The first symptoms of the disease are loss of appetite, nausea, weakness and diarrhoea. These are followed by pains in the muscles, fever and swelling of the limbs, and sometimes by stiffening of the joints. The disease runs its course in about four weeks. From ten to thirty per cent of the cases are fatal.

No means is known of destroying the parasites after they have reached the muscles, but if, as soon as infection is suspected, castor oil or calomel is given in quantities, the embryos will be expelled from the intestines, and health will return. As a general preventive measure, no pork should be eaten by any one, unless it has been thoroughly cooked. Smoking, as in the treatment of hams, is not sufficient to kill trichinae. The real cause of the disease was first made known about 1860, though cases of it had been known in Europe

since the beginning of the century. It has appeared in the United States and in most parts of Europe, occasionally as an epidemic.

TRI'COLOR, the French national flag, or one formed after the model of it. The French tricolor is blue, white and red, in equal vertical sections, the blue being next the flagstaff.

TRICYCLE, *tri'sik'l*, a three-wheeled vehicle propelled by the hands or feet. It is adapted to several uses, being made to serve as a child's plaything or as a means of locomotion for those who cannot walk. Most tricycles are made with two large wheels, between which is the seat, and a small wheel extending forward, used as a balance and guide. They have been in use since 1878.

TRIEST, *tre est'*, ITALY, until 1918 the chief seaport of Austria-Hungary, is situated on the Gulf of Triest, an arm of the Adriatic Sea, seventy-three miles northeast of Venice and 214 miles southwest of Vienna. The city consists of an old town, with narrow streets, which rise rapidly from the harbor to the heights beyond, and a new quarter, which is built on modern plans. The two parts of the city are separated by a street known as the Corso. Some of the important buildings are the townhall, the Cathedral of San Giusto which occupies the site of a former Roman temple, and the Greek church. There are also a number of ruins of ancient Roman structures, including those of a theatre and an aqueduct. The city has a number of public squares and a public garden. It is one of the most important trade and manufacturing centers on the Adriatic, and has an extensive commerce. Its manufactures include naval stores, machinery, soap, candles, leather and refined petroleum. In the World War Triest was the objective of the Italian drive under General Cadorna, and the Italian army approached within twelve miles of the city. In the adjustment of boundaries after the war the city fell within Italian territory. Population, 1914, 250,500.

TRIGONOM'ETRY, that branch of mathematics which treats of the measurement of triangles. It follows geometry in a course of study and depends upon certain truths there demonstrated, such as the sum of the angles of a triangle is equal to two right angles; if three parts of a triangle, one of which is a side, are known, the other parts can be found by computation. Trigonometry is divided into two branches, *plane trigonometry* and *spherical trigonometry*, the first named treat-

ing of plane triangles, the second of spherical triangles.

The value of trigonometry in many practical pursuits, such as engineering, surveying and astronomy, is almost inestimable, since it makes possible the measurement of distances and magnitudes which could be measured in no other way, on account of physical obstructions or other conditions. Examples of this use may be found in measuring the distance between two objects on the opposite banks of a stream, without crossing, and measuring the height of a mountain above its base. See MATHEMATICS.

TRILLIUM, or **WAKE ROBIN**, an early spring wild flower, belonging to the lily family, to the other members of which it bears little resemblance. There are various species, but they all are governed, as their name indicates, by the rule of three; the three-sepaled, three-petaled flower rises out of a whorl of three leaves. The painted trillium, with its white petals veined with pink, and the white trillium, or wood lily, are the most beautiful. The purplish red trillium, popularly known as "devil in the bandbox," has a very unpleasant odor.

TRINIDAD, next to Jamaica, the largest and most valuable of the British West Indies, situated off the coast of Venezuela, opposite the northern mouths of the Orinoco. It is about fifty-five miles long and forty miles wide, and its area is 1,754 square miles, a little more than that of the state of Rhode Island. Most of the island is traversed by ranges of hills, covered with forests. The most remarkable natural feature of the island is Pitch Lake, the world's chief source of asphalt. This lake covers ninety acres and yields 190,000 tons of asphalt annually (see ASPHALT). From the lake to Labrae, the nearest port, a road has been built over a bed of asphalt which is moving slowly, glacierlike, toward the sea.

Trinidad is an English crown colony, administered by a governor and a legislative council. Port of Spain, on the northwest coast, is the capital. The population is about 330,000, including Europeans, emigrants from India and negroes.

The island is well watered and has plenty of rainfall. Palms, silk cotton trees, breadfruit, bamboo, coffee, cacao, bananas and sugar cane are grown. Coffee, cacao, bananas and sugar cane are exported to a considerable extent.

TRINIDAD, COLO., the county seat of Las Animas County, ninety miles south of Pueblo, on the Denver & Rio Grande, the Atchison, Topeka & Santa Fé and the Colorado Southern railroads. The city is in a valley, among the eastern foothills of the Rocky Mountains, southeast of the Spanish Peaks and north of Fisher's Peak. It is surrounded by a farming and sheep and cattle-raising section, and is near extensive coal mines. Railroad shops, coke ovens and wool-scouring plants are located here. Notable buildings are a county courthouse, a Carnegie Library, Saint Joseph's Academy and Saint Raphael's Hospital. Population, 1910, 10,204; in 1920, 10,906, a gain of 7 per cent.

TRINITROTOLUOL, *tri ni tro tol' uol*, popularly known as T. N. T., and one of the most powerful explosives known, is a compound of toluene and nitrogen peroxide. It is a white to pale-yellow solid that melts at 148° F., and is used extensively for the explosive charge of armor-piercing shells, and for torpedoes and mines. Under the influence of mercury fulminate it explodes with incredible violence. It is loaded into shells in a molten state and cooled under pressure. T. N. T. not only explodes with great violence, but in exploding it increases the effect of other explosives present, such as dynamite; for this reason it is used in detonating caps and fuses. A form of fuse made by filling a small lead pipe with molten trinitrotoluol is used when it is desired to explode several charges simultaneously, because the detonating effect will travel through this tube at the rate of 4,000 meters per second. Vast quantities of T. N. T. were used in the World War.

TRINITY, a theological name given to the doctrine which declares the union of the Father, the Son and the Holy Spirit as Three Persons and One God. The doctrine of the Trinity is a development of Christian theology. It is nowhere expressly taught in the Old Testament; however, it is implied in the New Testament. The doctrine was first authoritatively stated at the Council of Nice in 325. The definition of the Trinity generally accepted by orthodox Christians is that there are in the Godhead three persons, who are one in substance, coeternal and equal in power. The term *persons* is not strictly applicable to the Trinity, but something analogous to the conception of personality seems to be implied in the apostolical arguments of the epistles.

TRINITY SUNDAY, the Sunday after Whitsunday. It was definitely established as a Church festival by Pope John XXII in 1334. All the principal festivals occur in the half year between Advent Sunday and Trinity, and all the Sundays from Trinity to Advent are called Sundays after Trinity.

TRIPLE ALLIANCE, an alliance of three powers, a system of diplomacy in vogue in Europe after the close of the Franco-German War, primarily instituted by the German statesman, Bismarck, for the purpose of maintaining balance of power. An alliance was negotiated in 1872 between Germany, Austria and Russia. Conflicting interests in the Balkans prevented this alliance from being a strong one, and when Bismarck retired from office in 1890 William II abandoned the policy of an understanding with Russia, devoting his efforts to the strengthening of a Dual Alliance between Germany and Austria.

The last triple alliance was that effected between Germany, Austria-Hungary and Italy in 1882. This continued, with signs of weakening on the part of Italy, till the outbreak of the World War, when Italy declared neutrality. This neutrality was broken in 1915 by Italy's declaration of war upon Austria. See **WORLD WAR**.

TRIPLE ENTENTE, *ahn tahnt'*, the name popularly applied to the alliance of Great Britain, France and Russia, formed chiefly through the efforts of King Edward VII. The year 1907 saw a series of treaties ratified between these countries, all the treaties having mutual protection of interests as an object. France and Great Britain came to an agreement as to their Mediterranean policy, and largely to Great Britain's influence the French naval power was later concentrated in the Mediterranean, Great Britain practically guaranteeing to protect the northern coast of France against any invaders. Russia and Great Britain also came to the agreement about their policies in Persia, Afghanistan and Tibet, where conflict had sometimes been very near. In a general way the Triple Entente was planned to offset the Triple Alliance (which see), and to maintain the balance of power between the European nations. It was in fulfilment of its agreement with France in this alliance that Great Britain entered the World War against the Central Powers. The Triple Entente and Triple Alliance were set aside by the treaty which ended the World War.

TRIPOLI, an Italian dependency in North Africa, between the Libyan Desert on the east, and Tunis and the Sahara Desert on the west. It has an estimated area of 406,000 square miles. In ancient times Tripoli belonged to the Carthaginians, passing from them to Rome. Later it was captured by the Vandals and Greeks, and in the seventh century by the Arabs (see **BARBARY STATES**). From 1551 till 1911, at which date it was ceded to Italy, Tripoli was a part of the Ottoman Empire, though the sultan rarely exerted much authority over the territory. For much of this period it was the stronghold of piratical bands, whose depredations on the seas caused successive expeditions against Tripoli to be made by England and France. In 1801-05 the United States was at war with Tripoli, and in 1815 an American expedition exacted reparation for injuries done to American commerce. When it passed to Italy in 1911 the Italian government announced that the dependency would be known officially as *Libya Italiana*.

Tripoli has a strip of lowland along the coast, but its altitude rises toward the interior, a large portion of which is a barren plateau. In the southwest is an elevation 3,000 feet above sea level, which forms parts of the mountain range known as Jebel-Nefusa. Beyond this is a low plain, irrigated by wells and cultivated. A fertile portion of the country lies along the Mediterranean, in a strip extending on each side of the city of Tripoli, to a width of about five miles. Wheat, barley, Indian corn and millet are the principal grains grown. The fruits include dates, olives, grapes, pomegranates, lemons, figs, apricots and plums. Melons and garden vegetables are raised. In some sections along the coast, cotton, tobacco, silk, saffron and madder are produced. The summers are hot, though tempered by sea breezes along the coast. The winters are cool, and on the highest mountains snow is sometimes seen. Population, 1921, 569,093 natives (chiefly Berbers), 28,364 Europeans, and numerous Jews.

Tripoli, the capital and principal seaport, is situated on a promontory on the Mediterranean coast. It is a typically Oriental city, with narrow streets and squalid living quarters surrounded by the domes and minarets of Mohammedanism. It is the northern terminus of three important caravan routes across the Sahara, and manufactures carpets,

scarfs and Spanish leather. Trade is mainly in the hands of the Jews. Population, about 75,000.

TRI'REME, a word meaning *three-oared*, was a Greek war vessel of the fifth and fourth centuries B. C., long and light, propelled by three banks of oars and steered by paddles on either side of the stern. A trireme was provided with sails, but these were discarded on going into battle. At Salamis, the great naval battle between the Persians and the Greeks in 480 B. C., the Grecian fleet numbered 380 ships, most of which were triremes.

TRIUMPH, in ancient Roman history, a magnificent procession, the highest military honor awarded a victorious general. It was granted by the Senate only to one who had held the office of dictator, consul or praetor, and then only after a decisive victory or the complete subjugation of a province. The general to whom this honor was awarded entered Rome in a chariot drawn by four horses. He was clad in a flowered tunic and embroidered robe, was crowned with laurel and had a scepter in one hand and a branch of laurel in the other. The Senate and the magistrates, the musicians, the spoils and the captives in fetters formed part of the procession which went before him, and he was followed by his army on foot, in marching order. The procession advanced along the *Via Sacra* to the Capitol, where a bull was sacrificed to Jupiter. Banquets and other entertainments concluded the solemnity. The day was made one of jesting, carnival and license on the part of the soldiery and populace.

A naval triumph was celebrated in much the same manner, but upon a smaller scale and with the use of beaks of ships and other nautical trophies.

TRIUMVIRATE, a political coalition of three men. There were two famous coalitions in Roman history, the first formed in 59 B. C., by Caesar, Pompey and Crassus; the second in 43 B. C., by Anthony, Octavius and Lepidus. The first was illegal, being merely an alliance of powerful individuals. The second was a real triumvirate existing by recognition of the Roman Senate.

TRO'GON, a genus of tropical birds, of which there are about fifty species in both hemispheres, principally in America. Their plumage is soft, full and brilliantly colored, and most species have long, graceful-appearing tails. Their foot structure is peculiar, the first and second toes pointing backward

and the third and fourth forward. Trogons nest in the tops of rotting stumps. Their voices are loud and harsh. The gorgeous Central American trogon known as the *quetzal* was anciently regarded as sacred by the Mayas, and is still the national symbol of Guatemala. See QUETZAL.

TRO'JAN WAR. See TROY; MYTHOLOGY.

TROLLING, *trole'ing*, a method of fishing, in which a spoon hook is dragged at the end of a long line behind a boat. This is a favorite method for bass, pickerel and some sea fish. See ANGLING.

TROLLOPE, *trol'lup*, ANTHONY (1815-1882), an English novelist, author of *The Warden*, *The Last Chronicle of Barset*, *The Way We Live Now*, *The Claverings*, *Barchester Towers* and other delightful studies of English society of his time. His works are characterized by keenness of insight, realism of detail and an equal command of humor and pathos. He particularly excels in portraits of the clergy and delineation of life in cathedral towns.

TROM'BONE, a powerful wind-instrument of the trumpet kind, possessing a complete chromatic scale, like a violin or the human voice. It consists of a tube twice bent, ending in a trumpet-shaped bell, and is sounded by means of a cup-shaped mouth-piece and the manipulation of a slide. Trombones in general use are of three kinds—alto, tenor and bass. Their full rich tones make them favorite instruments in bands and orchestras.

TROMP, MARTIN HARPERTZON (1597-1653), a Dutch admiral, victor over a Spanish fleet off Gravelines in the Straits of Dover in 1639, and over the English fleet under Blake off Goodwin Sands in 1652. The latter victory made the Dutch for a few months supreme in the Channel, but the following spring a new and larger English fleet under Blake, Penn and Monk attacked the Dutch vessels, which were old, poorly-equipped and no match for their adversaries. Tromp, however, retreated with coolness and heroism, bringing 125 merchantmen to safe harbor in Holland. In June of the same year he was killed in another battle with the English.

TROP'IC BIRD, or **BOAT'SWAIN**, a sea bird helpless on land but powerful on the wing, often flying hundreds of miles to hover over ships, spending whole days in the air and capturing fish by diving into the water from a great height. Its plumage is white and

satiny, often tinged with pink and variegated by blackish patches. It is distinguished by unusually long wings and two long, willowy, middle tailfeathers. It makes no nest, but deposits its single egg in a hole or crevice in a cliff. Tropic Birds breed in colonies, and male and female incubate in turn.

TROPICS, *trop'iks*, in astronomy, two circles on the celestial sphere, each $23\frac{1}{2}^{\circ}$ distant from the equator. The northern tropic touches the ecliptic at the sign Cancer, and is known as the tropic of *Cancer*; the southern, for a similar reason, is called the tropic of *Capricorn*. The annual path of the sun in the heavens is bounded by these two circles, and when in its journey northward or southward it reaches either of them, it appears to turn back and travel in the opposite direction.

Geographically, the tropics are two parallels of latitude, each $23\frac{1}{2}^{\circ}$ distant from the terrestrial equator. Over these circles the sun is vertical when farthest north, or farthest south, that is, at the solstices. The tropics include between them that portion of the globe called the torrid zone. See SOLSTICE.

TROTZKY, *trots'ki*, LEON (born 1877), a Russian radical, one of the leaders of the the Bolshevik party that overthrew the Kerensky government in November, 1917. He was a close associate of Nikolai Lenine throughout the period of Bolshevik rule in Russia. Trotzky's real name is LEBER BRONSTEIN. For many years previous to the revolution he had been agitating radical ideas, and from 1905 to 1912 he lived in Siberia as an exile. Subsequently in Berlin, Paris and Spain he attempted to spread his revolutionary ideas, but was suppressed, and finally he went to America, where he would be free to continue his propaganda.

He edited a radical paper entitled the *New World* in New York City, and mingled with Russian agitators on the East Side. When the czar was overthrown Trotzky returned to Russia and joined with Lenine in the movement which established a soviet republic. He was made Minister of Foreign Affairs in the first Bolshevik Cabinet, but later he became Minister of War. To him was entrusted the training of a great revolutionary army to check the factions opposed to Bolshevism and to coerce the ring of small states about Central Russia. This army, numbering more than a million men, was still fighting successfully in the summer of 1919. Trotzky is a

man of ability, an effective writer and a powerful orator. See RUSSIA; LENINE, NIKOLAI.

TROUBADOUR, *troo'ba dohr*, a class of medieval poets first appearing in Provence in the twelfth century, and flourishing for three centuries in Southern France, North Italy and Spain. They were the composers and singers of a species of lyrical poetry, devoted to romantic gallantry and generally very complicated in regard to meter and rhyme. Troubadours wandered from estate to estate and court to court, depending upon the nobles and ladies whom they flattered and entertained to reward their musical and poetic skill. With the fall of the feudal system, of which they were the expression, the troubadours disappeared.

TROUT, *trowt*, the common name of a group of fishes belonging to the salmon family and living in streams and fresh-water lakes. The common trout may be found in



LAKE TROUT

Northern Europe and North America, in rivers and lakes and even in small streams. The *speckled brook trout*, most highly prized of food fishes, was formerly found in large numbers in the streams of the New England states, Northern New York, Michigan, Wisconsin and westward, but it was nearly exterminated, except in wild regions or in carefully-guarded streams. Fish commissions have restocked waters of those states, and the angling season for brook trout is now strictly limited by law. There are several species of lake trout in America, among the finest and largest of which is the *Mackinaw trout*. The North American lake trout attains a weight of more than sixty pounds, but specimens of this size are rare. All species of trout are valuable food fish, and laws in many states protect them.

TROUVERE, *troo vair'*, a class of medieval poets of Northern France, corresponding broadly to the *troubadours* of Provence. Though their writings were mainly concerned

with an artificial treatment of the subject of love, they were sometimes of a narrative character and as such made valuable contribution to the development of French literature. See TROUBADOUR.

TROVATORE, IL, *eel tro va toh' rah*. See IL TROVATORE.

TROWBRIDGE, *tro'brij*, JOHN TOWNSEND (1827-1916), an American novelist, poet and writer of stories for boys, author of *Neighbor Jackwood*, a strong protest against slavery, published in 1857, *Cudjo's Cave*, *The Jack Hazard Series*, *My Own Story*, an autobiography full of interesting references to the literature of the latter half of the nineteenth century, and *Vagabonds and Other Poems*. He is also known for his verse, "Darius Green and his Flying Machine," an amusing satire on early attempts to fly.

TROY, or **ILIUM**, an ancient city in the Troad, a territory in the northwest of Asia Minor, south of the western extremity of the Hellespont, rendered famous by Homer's epic of the *Iliad*. There have been various opinions regarding the site of the Homeric city, the most probable of which places ancient Troy at the head of the plain bounded by the modern river Mendereh, supposed to be the Scamander of Homer, and the Dombrek, probably the Homeric Simois. The Ilium of history was founded about 700 B. C. by Aeolic Greeks, and it was regarded as occupying the site of the ancient city. Modern excavations tend to prove the existence of prehistoric Troy, but no one knows whether or not there was a Trojan War. The fascinating story of this legend is told in these volumes in the article MYTHOLOGY.

TROY, N. Y., the county seat of Rensselaer County, 150 miles north of New York City and six miles above Albany, on the east bank of the Hudson River, at the head of navigation and opposite the outlets of the Erie and Champlain canals, and on the Boston & Maine, the Delaware & Hudson, the Rutland and the New York Central railroads. It is the center of several interurban trolley systems. The city stretches along the river on a level alluvial plain for more than six miles, rising to the east on a range of hills about 500 feet, affording a fine residence section. The water front is seven miles long and is occupied by large factories and business houses. Troy is the fourth city industrially in the state of New York, and is fifth in its commerce. Transportation facilities are exceptional, and

the state dam across the Hudson and the falls of two creeks supply water power.

Troy leads in the manufacture of collars, cuffs and shirts, producing between eighty and ninety per cent of all the collars made in America. There is an extensive system of laundries, and the various iron and steel works produce laundry machinery, collar-making machinery, stoves, bells, valves, horseshoes and engineering instruments. There are knitting, paper and flour mills, brickyards and other establishments.

The principal educational institutions are the Emma Willard Seminary for the higher education of women and the Rensselaer Polytechnic Institute. The Hart Memorial Library is a fine structure built in Renaissance style of white marble. There are various charitable institutions, including the Troy and Samaritan hospitals, Marshall Sanitarium, Troy Orphan Asylum, House of the Good Shepherd, a reformatory, the Day Home and several other homes and orphanages. Other important structures are the Federal building; the city hall; the savings bank building, with its music hall; Rensselaer Hotel; Union Passenger Station; Rowe Memorial Building; the Y. M. C. A., and the state armory.

The town was laid out in 1787, and the present name was adopted two years later. It was incorporated as a village in 1794 and was chartered as a city in 1816. During the Revolution the American army encamped on the island at the mouth of the Mohawk River opposite Troy and built earthworks on the north side. During the War of 1812 a certain Samuel Willson, familiarly known as "Uncle Sam," was engaged in packing meat in barrels for the army. The story is told that in reply to an inquiry as to what was meant by the letters U. S., on one of these barrels of meat, the answer was jokingly given, "Uncle Sam." This is one version of the origin of the national nickname. Population, 1910, 76,813; in 1920, 72,013, a loss of 6 per cent.

TROY WEIGHT, a weight chiefly used in weighing gold, silver and articles of jewelry. The troy pound contains 12 ounces; each ounce is divided into 20 pennyweights, and each pennyweight is equal to 24 grains. Hence, the pound contains 5,760 grains, and the ounce, 480 grains. As the avoirdupois pound (the weight in general commercial use) contains 7,000 grains, and the ounce

437½ grains, the troy pound is to the avoirdupois as 144 to 175, and the troy ounce to the avoirdupois, as 192 to 175.

TRUFFLE, *truf'l*, a fungus which grows underground, without visible root. Several species are highly flavored and are used in cookery. The common truffle, found in Central and Southern Europe, grows in loose soils, in woods and in pastures. The size ranges from one inch to several inches. It is black or brown and has a rough, warty surface. Truffles have a strong and pleasing odor, and dogs and pigs are trained to locate them by the scent. These fungi are not found in North America. In normal times about 20,000 pounds are imported from France by the United States.

TRUM'BULL, JONATHAN (1710-1785), an American patriot and statesman, born at Lebanon, Conn., and educated at Harvard. He was successively judge, deputy governor and governor (1769-1783) of Connecticut and took a prominent part in forwarding the War of Independence. Washington placed great reliance on him and frequently consulted him. According to tradition Washington called him "Brother Jonathan," and this appellation came to be used as a sort of nickname for the people of the United States.

TRUMBULL, LYMAN (1813-1896), an American jurist and political leader, born at Colchester, Conn. He received an academic education, taught school for a time, and in 1837 was admitted to the bar. He removed to Belleville, Ill., and was elected to the legislature. In 1841 he became secretary of state, and from 1848 to 1853 was a justice of the state supreme court. Two years after the latter date he was elected to the United States Senate and served until 1873, when he moved to Chicago and returned to the practice of law. He began his political career as a Democrat, but joined the Republican party, upheld the administration throughout the Civil War and drafted the Thirteenth Amendment to the Constitution. He returned to the Democratic party after the war and voted in the Senate against the impeachment of President Johnson. In 1894 he joined the Populists, and defended the railroad strike leaders in Chicago in 1894.

TRUM'PET, one of the oldest wind-instruments of music. In its modern form it consists of a metal tube (usually brass, sometimes silver), about eight feet long, doubled up in the form of a parabola, and

expanding into a bell-shaped end. The instrument is sounded through a cup-shaped mouthpiece. The trumpet tuned on C produces with great power and brilliancy the following series of tones in an ascending scale: C in the second space of the bass clef, G, C, E, G, B, C, D, E and G.

TRUMPET FLOWER, a climbing plant belonging to the bignonia family, having bright red, trumpet-shaped flowers. In the United States it is found from Illinois to New York, and from the Great Lakes to the Gulf. In the shadowy woods, where it climbs upon the tree trunks, or along the sunny roadside, trailing over bushes and fences, it is a gorgeous spectacle, one of the showiest of the native wild flowers.

TRU'RO, NOVA SCOTIA, the county town of Colchester County, on the Canadian Government and the Dominion Atlantic railways, and on the Salmon River, about two miles from the head of Cobequid Bay, the easternmost arm of the Bay of Fundy. The manufactures include lasts, pegs, hats and caps, knitted goods, leather, foundry products and condensed milk. The town is noted for its fine public buildings, among which are the county buildings, the provincial, normal and model schools and Truro Academy. Population 1911, 6,107; in 1921, 7,651.

TRUST COMPANY, a financial organization for the purpose of acting as trustee in settling estates and caring for funds of minors, and in many instances carrying on a savings-bank or even a general banking business. The great advantage possessed by these companies is the fact that they are not, as a rule, required by law to keep a large fixed reserve on hand, whereas the national banks are required to keep at least 15% in smaller cities, and 25% in the larger "reserve cities" such as New York and Chicago. A conservative trust company, of course, will keep a reasonable balance on hand, for the sake of its own safety; but the opportunity to use all its resources when necessary has been of great advantage at times. On the other hand, there has been the temptation to make dishonest use of this privilege, and some of the great companies have suffered from the dishonesty of individuals. A great inducement to depositors has been the fact that the trust companies, with their greater privileges, have been able to offer interest as well as the use of a checking account. The deposits of the trust com-

panies of the country to-day have a total of more than two billion dollars.

TRUSTEE', in law, a person to whom the management of property has been legally committed. A trust may be created by will, by deed or by oral statement, but trusts affecting real estate must be recorded in writing. A person may decline a trusteeship, but having once accepted it may not relinquish it except in cases where it is so provided in the deed or by discharge by a competent court. A trustee must report at stated times to the beneficiaries of the trust as to his care of the funds or property. He is liable for wrongful use or misappropriation of trust funds.

TRUSTS, in the commercial and industrial world, combinations of capitalists engaged in the same or closely-related lines of production or transportation. At first the term was applied to associations formed when the stockholders of the corporations interested transferred their stock to a few men who were chosen trustees. The stockholders received from these trustees certificates of the trust for the stock they deposited, and the management of the business was placed under the control of a few men. The term has now a much broader application.

Why Trusts are Formed. Trusts are the outgrowth of industrial conditions that have arisen since the middle of the nineteenth century. One of the strongest influences leading to their formation is the factory system, which has developed to enormous proportions. In addition to the factory system the following reasons are usually given for the formation of trusts:

1. Commodities can be produced more cheaply on a large scale than in small quantities.

2. Competition leads to such reductions in the selling price that many small factories make no profits, and some run at a loss.

3. Combination reduces expense of distribution. When each factory was working independently several salesmen traversed the same territory. When under the combination one would cover the ground successfully. Moreover, goods can be sold at less expense in large than in small quantities.

4. Combination does away with the duplication of plants and of advertising. A corporation like the United States Steel Corporation, for instance, manufactures a large number of products, such as steel rails, wire, nails, etc. Under one management one plant makes nails; another wire, and a third rails. Were these plants operating independently it is probable that each might find it necessary to

install an equipment for the manufacture of each of these products in order to compete with other mills.

5. The promoter is another important cause. Large commissions are paid the organizer of great corporations, and men who become experts in this line of work often persuade boards of directors to enter into combination with other corporations, when if left to themselves they might not give the proposition favorable consideration. Bankers also obtain large bonuses for underwriting these corporations, and their influence is not slight.

Holding Corporations. It was soon found that the sort of trust described above did not prevent waste to the extent expected. Furthermore, legislation against organizations of this sort as "combinations in restraint of trade" led the stockholders to realize that this kind of trust was not altogether safe. To meet these objections another form of corporation was devised. Under this plan a new company was organized with sufficient capital to buy the controlling interest of the independent companies. The officers of this new company could then control the affairs of each of these subsidiary companies, because they represented a majority of the stock. The Standard Oil Company (which see) and the United States Steel Corporation (which see) were the largest representatives of holding corporations. Under this plan many of the small corporations dissolve after disposing of a majority of their stock to the holding company.

Objections to Trusts. However advantageous the trust may be to capitalists, it has never found favor with a majority of the people in the United States and Canada. The chief objections brought against it are the following:

1. Instead of lowering prices, as would be supposed because of the decreased cost of production, prices have frequently been maintained at their former levels, and sometimes they have been raised.

2. Trusts in former years endeavored to keep wages down.

3. The manipulation of stocks by those in power often causes serious loss to investors.

4. The concentration of wealth in the hands of a few creates an unequal distribution of wealth and corresponding suffering on the part of the poor.

5. "The centralization of the power of industry in a few hands, with its enormous resulting wealth, is undemocratic, and makes the many dependent upon the few."

6. The ideals of democracy and trusts are antagonistic, and the two cannot exist with harmony in a free country.

Sherman Anti-Trust Law. This law, passed by Congress in 1890, is applied to all interstate trade. It declares any combination or conspiracy in restraint of interstate or international trade illegal, and that all such combinations must be dissolved by the United States Courts, upon proof furnished by the Attorney-General of the United States that they have violated the law.

This law has exerted a restraining influence over trusts, and under it some of the most noted combinations have been dissolved. Among these were the Standard Oil Company, the Northern Securities Company, the American Tobacco Company and the International Harvester Company.

TSCHAIKOWSKY, *chi kov'ske*, PETER ILYTCH. See TCHAIKOVSKY, PETER ILYTCH.

TSET'SE FLY, a biting insect related to the horse fly, found in certain tropical parts of Africa. It bites all warm-blooded animals, often with fatal result. The fly itself is not venomous, but, like the mosquito, carries disease germs which cause *sleeping* sickness in man, and in cattle, horses, and other animals a disease called *nagana*, which is often fatal. Animals not killed by *nagana* are rendered henceforth immune. The tsetse fly does not lay eggs, but produces full-grown larvae which immediately change into pupae. In limited areas the breeding places of the flies have been destroyed, but no sweeping and systematic plan has yet been undertaken to exterminate the pests.



TSETSE FLY

TUBERCULOSIS, *tu bur ku lo' sis*, the most prevalent of all diseases, is chronic, communicable, infectious, preventable and curable. It has caused, from the most ancient times, directly or indirectly, about one-seventh of all the deaths in the world, but a ray of hope exists in the fact that the disease is now being fought more persistently and more intelligently than ever before.

As the bacillus which causes it is almost always present in the air, it is probable that few people, especially in cities, escape infection. Fortunately, however, unless there is some weakness or predisposition toward the disease the human organism is able to throw off the infection or so to restrict its action that little harm results. Nevertheless, there is no disease whose ravages are so

severe or on which so much study is now being placed by scientists, physicians and all interested in public welfare. In 1882 Koch discovered the cause of tuberculosis, and since that time much has been done to better the condition of consumptives and to restrict the spread of the disease (see GERM THEORY OF DISEASE).

The infectious germ is thrown out of the lungs of a consumptive in the sputum, or spit, and it is not killed by drying. Accordingly, it is taken up by the air in the form of dust, and is carried anywhere and everywhere. It follows that every precaution should be taken to destroy the sputa of consumptives and the discharges from tuberculous sores; for while consumption is in the popular mind a disease of the lungs, yet it may and does affect any part of the body where the bacilli find lodgment. Tuberculosis of the bones, of the stomach and of the intestines is not uncommon. The disease is not confined to human beings, but may affect cattle, chickens, other domestic animals and, especially, wild animals kept in captivity. Any one of these may serve as a means for distributing the infectious germ. No specific has been found for consumption, though many have fraudulently been offered to the public. Doctor Koch's studies led him to advocate the use of a serum, or antitoxin, but it has not proved altogether successful. An open air life, with plenty of exercise, in a dry region not subjected to sudden changes of temperature, will do much to mitigate the severity of the disease, and if this precaution is taken early enough frequently it will effect a cure. See SERUM THERAPY.

TUBERROSE, *tube'roze*, a plant native to Asia and tropical America, inconspicuous in itself, but bearing remarkable flowers. From a tuberous rootstock spring six or eight sword-shaped leaves and a stalk on the end of which is borne a thick cluster of waxen-white, funnel-shaped blossoms, sickeningly sweet. The heavy odor of these blossoms is objectionable to most persons, but the plant is extensively cultivated as a source of perfume.

TUC'SON, *too sahn'*, ARIZ., the metropolis of the state and the county seat of Pima County, 121 miles southeast of Phoenix, on the Santa Cruz river and on the Southern Pacific, the Southern Pacific of Mexico, and the El Paso & Southwestern railroads. The city is located on a wide plateau at an al-

itude of 2,369 feet and has a very dry climate, considered excellent for people with lung and throat troubles. It is the center of one of the richest copper-producing regions in the world, ships two million dollars worth of cattle annually, and is rapidly developing as an agricultural center. Its industries include railroad shops, iron mills, tanneries, and flour, ice, brick and carriage works. The modern part of the city is well built, with attractive residences, good hotels and public buildings, while the old section remains typically Mexican in construction. Tucson is the seat of the University of Arizona and has good public schools, a high school, several sectarian schools, a Presbyterian boarding school for Indians, a Carnegie Library, a Roman Catholic hospital and sanitarium and the Desert Botanical Laboratory, erected by the Carnegie Institution of Washington. Historic Spanish missions and ruins, including the famous San Xavier Mission, make the place of especial interest to tourists. Tucson was first settled about 1776, by the Spaniards, by whom it was known as the Presidio de San Agustin del Tuguison. It was a part of the Gadsden Purchase of 1853, and from 1867 to 1877 was the capital of Arizona territory. The city has grown rapidly since 1900. It has been governed on the city manager plan since 1915. Population, 1910, 13,193; in 1920, 20,292, a gain of 54 per cent.

TUCUMAN, *too koo mahn'*, or **SAN MIGUEL DE TUCUMAN**, ARGENTINA, situated ninety-four miles northwest of Santiago, near the foot of a mountain range, on the Upper Dulce River. It is connected by railway with Buenos Aires, and has a cathedral, a normal school, a national college and other educational institutions. The industries include trade in live stock and the manufacture of spirituous liquors. Population, 91,216.

TUDOR, the family name of an English royal line, which reigned from 1485 to 1603. It was founded by Owen Tudor of Wales, who married the widowed queen of Henry V. The first of the Tudor sovereigns was Henry VII; the last was Elizabeth. The reigns of this family were noteworthy for the almost absolute authority exercised. See HENRY VII; HENRY VIII; EDWARD VI; MARY I; ELIZABETH.

TUDOR STYLE, a style of architecture which prevailed in England during the Tudor period, from 1485 to 1603. It was the last

phase of the so-called Perpendicular style, which was a modification of Gothic and was characterized by straight, perpendicular lines. During the reign of Elizabeth, which closed the Tudor period, the residences of the gentry were built with large, square windows, carved staircases, paneled ceilings, numerous fireplaces and chimneys, gables and much ornamental detail.

TUESDAY, *tuze'day*, the name of the third day of the week, derived from *Tyr*, or *Tiu*, the name of the Norse war god. The French name for Tuesday is *Mardi*, derived from *Mars*, the name of the Roman god of war. *Shrove Tuesday*, the Tuesday before Lent, is so called because it is a day of confession, when shrift is received.

TU'FA, a name applied to a light, porous substance resembling rocks, found about the craters of volcanoes, and to the porous, rock-like formations around mineral springs. While the formation of both is similar, the composition is unlike. Volcanic tufa is cemented ashes; the other is caused by the slow deposition of carbonate of lime and silica. Waters containing carbonate of lime on evaporating leave a deposit known as *calcareous tufa*; those containing a high percentage of silica build up a formation called *siliceous tufa*.

TUFTS COLLEGE, an institution of higher learning at Medford, Mass., founded in 1852 under the auspices of the Universalists. It comprises a college of liberal arts, medical, dental and theological departments, the Jackson College for Women, the Bromfield-Pearson School (preparatory for the engineering department) and the graduate school. The medical and dental colleges are at Boston. It maintains a biological laboratory at South Harpswell, Me., and the Barnum Museum of Natural History, the gift of the late P. T. Barnum, is especially rich in skeletons and mounted skins of animals. There are 300 instructors and over 1,700 students. The library contains over 73,000 volumes.

TUILERIES, *tweel re'*, or *twe'ler iz*, a royal palace which stood on the right bank of the Seine, in Paris. Catharine de' Medici began the building; Henry IV extended it, and Louis XIV enlarged and completed it. During the Revolution of 1830, the palace was sacked. It was restored to its former splendor by Louis Philippe, but in 1848 it was again pillaged. In 1871 it was almost entirely destroyed by the communists. The

garden of the Tuileries, adjoining the Louvre, is maintained as a public park.

TULANE, *tu lane'*, **UNIVERSITY**, an institution of higher learning, located at New Orleans, La. It has an interesting and unique history. It was established in 1847 by the legislature of the state, and continued to receive state support and to be known as the University of Louisiana until 1884. At this time Mr. Paul Tulane gave to administrators appointed by him \$1,000,000, which was to be used for the higher education of the people of Louisiana. Mr. Tulane's administrators decided not to found an independent college or university, but to use the entire income from his bequest for the development and maintenance of the already established University of Louisiana. They did so on condition that the state would forever exempt the property of the Tulane Education Fund from taxation. The state agreed to do this, and in recognition of the munificent gift of Mr. Tulane the institution was given its present name.

Tulane now has productive funds amounting to more than \$4,000,000. The institution has invested, in grounds, buildings and equipment, nearly \$2,500,000. Its medical department is one of the most famous schools of medicine in America. It is affiliated with the state Charity Hospital, one of the great hospitals of the world, which is supported at a cost of \$150,000 annually. Other departments include the colleges of arts and sciences, commerce and business administration, technology, law, dentistry and pharmacy. The institution in all departments has over 300 professors and instructors, and about 2,700 students. The H. Sophie Newcomb Memorial College, the woman's department of the university, has an endowment of \$3,000,000, being the best endowed college for women in the world. The library contains about 71,000 volumes.

TU'LIP, a genus of plants embracing about forty species belonging to the lily family, extensively cultivated in gardens. Most of the cultivated varieties are derived from a species introduced into Europe from Asia Minor in the sixteenth century. Tulips may be grown from seeds, but are usually cultivated from bulbs. The crisp leaves and flower stems spring directly from the bulb. The terminal bell-shaped blossoms are without calyx, and may be single or double. They have a wide range of color and some

are fragrant. The coloration is exquisite. Some of the flowers are of uniform tint; others are tints and shades of one color; still others are variegated. The tulip is usually identified with Holland, where it has been most successfully cultivated. There the plants are set out in great fields, and many of the loveliest specimens are produced. The wonderful black and brown tulips originated there.

TULIP TREE, a handsome North American tree of the magnolia family which bears on the ends of the branches yellow tulip-shaped flowers. It is one of the most magnificent of the forest trees of the United States, and next to the plane tree it is the largest of the deciduous trees, growing to a height of 140 feet. It is found from New England to Florida and as far west as Arkansas, and nowhere else; and is known variously as the poplar, whitewood or canoe-wood. The wood is light, compact and fine-grained, and it is employed for various useful purposes.

TULSA, OKLA., the county seat of Tulsa County, 118 miles northeast of Oklahoma City, on the Arkansas River and the Frisco, the Missouri, Kansas & Texas, the Atchison, Topeka & Santa Fé and Arkansas Valley & Western railroads. Tulsa lies in a rich agricultural country, but its rapid growth has been due largely to its proximity to oil and gas fields and coal mines. Its oil district is probably one of the richest in the world. Tulsa has many modern homes, fine business blocks, commodious churches, artistic school buildings and thriving factories. It has refineries, smelters, glass and stove factories and it manufactures car oil tanks. The general offices of some of the large oil companies are located in Tulsa.

Kendall College, a Presbyterian institution, is here. In 1917 Tulsa voted an issue of \$1,750,000 in bonds for highway improve-



COMMON TULIPS

ment in its county. The commission form of government was adopted in 1909. Population, 1910, 18,182; in 1920, 72,075, a gain of 296 per cent.

TUMBLEWEED, the popular name of several North American plants. They are of low, bunchy growth, and in the fall when dry and crisp, they become more or less ball-like, break from the stem and are rolled about over the ground by the wind. This is nature's way of distributing the seeds; the plant is a nuisance to farmers.

TUMOR, *tu'mur*, a surgical term, which in its widest sense means a swelling of any part of the body; more strictly, however, it implies a permanent enlargement, occasioned by a new growth, and not a mere increase in size of a natural part. Tumors may be considered in two well-defined classes, *simple*, benign, or innocent, tumors, and *malignant* tumors. The substance of tumors of the first class resembles some of the tissues of the body; they increase gradually in size, produce little inconvenience, except that which is occasioned by their size, and may be completely cured by a simple surgical operation. Malignant tumors usually terminate fatally.

TU'NA, or **TUNNY**, *tu'ni*, the name of the largest fish of the mackerel family. It is also called the *horse mackerel* and the great *albacore*. The body is thicker than that of the mackerel, and the tail is deeply forked. The largest specimens attain a length of ten feet and weigh 1,500 pounds, but fish of this size are seldom found. Tuna inhabit all warm seas. The flesh, even of the largest fish, is good, and tuna fisheries constitute an important industry in Southern Europe, and in Southern California around Catalina Island, where the fish are found in large numbers. Most of the California catch is canned. The flesh has a slight chicken flavor, and from this characteristic the tuna is sometimes called the *chicken of the sea*. The tuna is a gamey fish, and taking it with hook and line is rare sport for anglers.

TUNDRA, *toon'dra*, the name applied to the vast swampy plains bordering on the Arctic Ocean in Europe, Asia and North America. In summer the ground thaws to a depth of a foot and a half or two feet, and then the tundra becomes covered with a dense growth of flat moss and is sprinkled with wild flowers. In this season it is visited by birds and fur-coated animals. These vast tracts can be crossed only in winter.

TUNG'STEN, a heavy metal, discovered in 1781. It has a grayish-white color and considerable luster. It is brittle, nearly as hard as steel, and less fusible than manganese. The ores of this metal are the native tungstate of lime and the tungstate of iron and manganese, which latter is also known as *wolfram*. It is now very popular as a filament for incandescent electric light globes. See **ELECTRIC LIGHT**.

TU'NIC, an ancient form of garment, in constant use among the Greeks and Romans. It was worn by both sexes, under the *toga* or the *stola*, and was fastened by a girdle or belt about the waist. The word is popularly applied to any long, loose garment hung from the shoulder and caught at the waist by a belt.

TUNING FORK, a steel instrument, with two prongs, which, when set in vibration, give forth a musical sound of a certain fixed pitch. The ordinary tuning fork sounds only one note, usually the middle, or tenor, C, or the A below it. Some tuning forks are made with a slider on each prong, by means of which a number of notes may be produced.

TU'NIS, a French protectorate in Northern Africa, lying between Tripoli and Algeria and bounded on the north and east by the Mediterranean Sea. It has an area of 45,000 square miles, divided into a fertile plateau in the northern part and a continuation of the Sahara Desert in the south. The plateau region is well watered and produces profitable crops of wheat, barley, oats, olives, citrus fruits and grapes. The climate is healthful, and there are many European colonists who have greatly improved the methods of agriculture and means of transit. The oases of the desert regions yield a large output of dates. Stock raising and mining are important industries, the principal mineral products being zinc, lead, iron, salt and phosphates. There are few industries except the household industries of the natives, who make carpets, saddles and other leather articles and woolen goods. The fisheries yield sardines, tunny and sponges.

Tunis in ancient times was successively a part of Carthaginian, Roman and Vandal dominions. The Arabs in the seventh century and the Ottoman Empire in the sixteenth gained domination over the territory. In 1881 France, to punish raids upon Algeria, sent an expedition into Tunis, at the same time stationing a squadron in the harbor.

After subduing an outbreak on the part of the natives, it established a protectorate over the little country.

TUN'NEL, an underground passage cut through a hill, a rock or any eminence, or cut under a river or a town, to carry a canal, a road or a railway. In the construction of canals and railways, tunnels are frequently excavated, in order to preserve the desired level and for various other local causes. Tunnels, when not pierced through solid rock, have usually an arched roof and are lined with brickwork or masonry. The sectional form of the passage is various. Among the greatest works of this kind are the tunnels of Saint Gotthard, Mount Cenis, the Arlberg and the Simplon. In America the Hoosac Tunnel, the Cascade Tunnel in Washington and those constructed under the Hudson and East rivers by the Pennsylvania railroad, to provide a means of entrance for its trains into New York City, are the most important. The two Pennsylvania tunnels under the Hudson River from Weehawken to New York have an inside diameter of 21 feet 2 inches, and a length under water of 6,118 feet. These tunnels were completed in 1910. All are really tubes made of iron or steel rings, with an average thickness of sixteen to twenty inches.

TUN'NY, the largest species of mackerel. These fish live in shoals in almost all the seas of the warmer and temperate parts of the earth. They are taken in immense quantities on the Mediterranean coasts, where the fishing is chiefly carried on. The flesh, which is delicate and somewhat resembles veal, has been highly valued since ancient times. The common tunny attains a length of ten feet and sometimes exceeds half a ton in weight. Its color is a dark blue on the upper parts and silvery white below. The American tunny is found on the coast from New York to Nova Scotia, and also in the Pacific Ocean off Santa Catalina, where it is known as the tuna. See **MACKEREL**.

TUPPER, CHARLES, Sir (1821-1915), a Canadian statesman, was born at Amherst, Nova Scotia, and educated at Horton Academy and Edinburgh University, where he studied medicine. Returning to Nova Scotia to practice his profession. He entered public life as a Conservative member for Cumberland County in the provincial assembly. From 1857 to 1860 he was provincial secretary and from 1863 to 1867 he was premier.

In discussions preceding Confederation Sir Charles took a leading part. He declined office in the first Dominion Cabinet, but in 1870 accepted the presidency of the Privy council, later becoming Minister of Inland Revenue and then Minister of Customs. From 1873 to 1878 he continued to serve in the House of Commons and in 1878, in Sir John Macdonald's second ministry, became in turn Minister of Public Works and Minister of Railways and Canals. Sir



SIR CHARLES
TUPPER

Charles was prominent in support of the Canadian Pacific Railway and in 1887, as finance Minister, he floated a large loan on its behalf. From 1884 to 1887, and again from 1888 to 1896, he was Canada's high commissioner in London. In April, 1896, he succeeded Sir Mackenzie Bowell as Premier of Canada, but at the general elections in June the Conservatives were defeated. Sir Charles continued to lead his party in the House of Commons until 1900, when he was defeated for reelection and retired to private life. (For portrait, see **PREMIER**).

TURA'NIAN, a term formerly applied to all Asiatic languages which were neither Aryan nor Semitic, but which to-day has little scientific usage. The group of related languages of Europe, Asia (except China) and Oceania, which are neither Aryan nor Semitic, are now designated respectively as Ural-Altaic or Finno-Ugric, Dravidian, Kolarian, Tibeto-Burman, Khasi, Malayo-Polynesian, Mon-Anam and Tai.

TUR'BAN, a form of headdress worn by

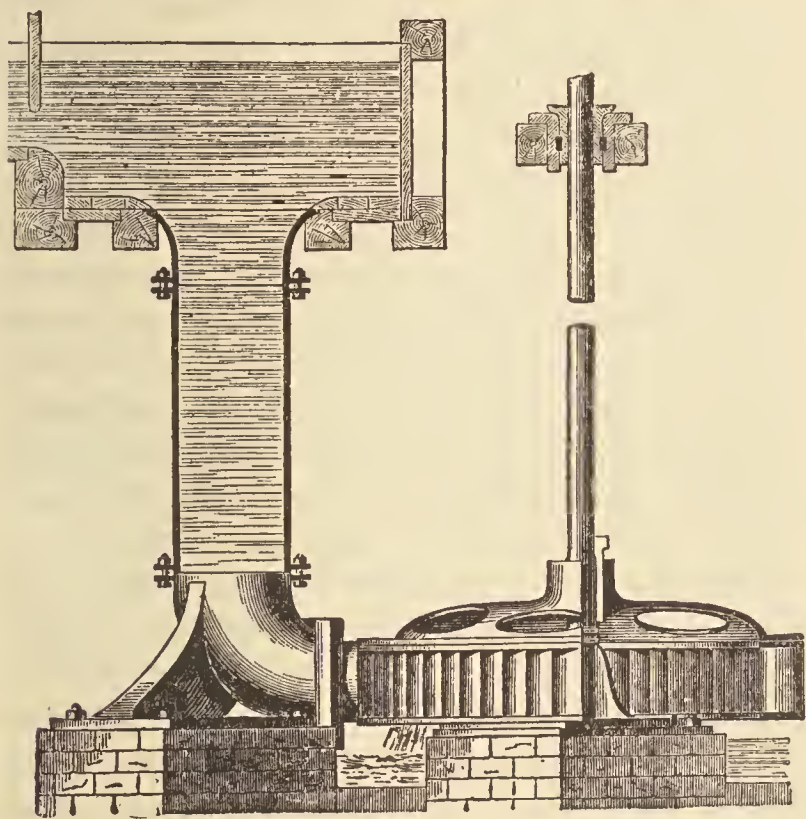


TURBANS

Oriental. It varies in form and color in different nations and among different classes of the same nation, but usually it is a scarf

folded around the top of the head or over a cap. In India priests customarily wear white turbans; those of high rank wear brightly colored ones. Until comparatively recent times turbans made of bandana handkerchiefs were generally worn by negro women in the Southern states.

TURBINE, *tur'bin*, a waterwheel which the water enters and leaves at all points on its circumference. The turbine wheel is enclosed in a close-fitting iron box and is usually attached to a vertical shaft. It operates on the principle of the Barker's mill (which see). The circumference of the wheel is provided with floats, all of which point in the same direction. The sides of the box in which the wheel is enclosed are called par-

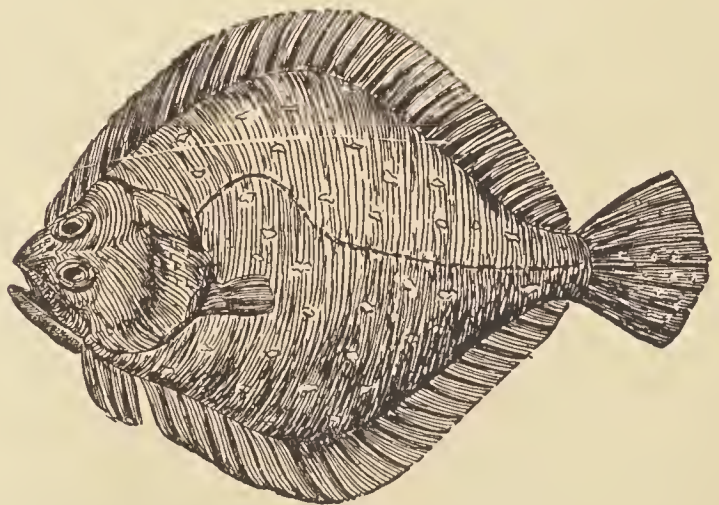


TURBINE WHEEL

titions and in number are equal to the floats of the wheel; they point in the opposite direction. The water is admitted to the box through a vertical or oblique iron pipe, called the *penstock*. The wheel is placed at the lowest possible point, since the power exerted depends upon the pressure of the water. When the water flows through the box, the floats on the edges give it a direction opposite to that in which the floats on the wheel point. As the current of water strikes these floats they tend to turn it in the opposite direction, and the reaction upon the floats causes the wheel to revolve. The size of turbines varies from a few inches to eighteen feet in diameter. The turbine is the most powerful waterwheel in use, as it utilizes ninety per cent of the power employed. The largest are at Niagara Falls and Keokuk.

Steam Turbine. The steam turbine is a form of motor which uses the expansive force of steam to produce motion, by bringing the steam in contact with floats on an axis, similar to the floats of an ordinary water turbine. The steam turbine is enclosed in a steel case, which has veins between the floats extending inward almost to the axis. The veins and floats are curved in opposite directions, so that the current of steam is reversed as it comes in contact with them, and the reaction caused by this reversal of the current forces the floats along and causes the axis to rotate. The steam turbine is really several turbines attached to the same axis, each succeeding one having a slightly larger diameter, in order to adapt it to the pressure of the expanding steam. Steam turbines are used for power upon steamships, where they have taken the place of the common steam engine very satisfactorily. The first steamer equipped with this form of motor crossed the Atlantic early in the spring of 1905. The use of the turbine relieves the ship from the strain arising from the action of an ordinary engine and also enables the vessel to maintain a more uniform rate of speed. Steam turbines are also employed in operating large dynamos where water power is not available.

TURBOT, the most valuable of all flatfish. It is shorter and broader than most flatfish and sometimes weighs nearly a hundred pounds, though the average weight is twenty pounds. The upper surface is brown and studded with tubercles. These fish live in the ocean depths along the banks. The



TURBOT

eggs—from five million to ten million to a fish—float upon the surface. The American *spotted turbot* is common on the North Atlantic coast, and is one of the most highly valued of food fishes.

TURGENIEFF, *toor gane'yef*, IVAN SERGEYEVITCH (1818-1883), one of the foremost of Russian novelists. He was born at Orel, the son of a wealthy nobleman, and was educated at Moscow, Saint Petersburg (Petrograd) and Berlin. He came to an open rupture with his mother because of her treatment of the serfs, and had to secure a government clerkship for support. When his mother died he immediately freed all the serfs belonging to the family estate. His *Annals of a Sportsman*, describing the ill-treatment of the peasants, was eagerly read by the heir apparent to the throne, Alexander II, and it had much to do with the freeing of the nation's serfs. Almost all of his subsequent writing dealt with social conditions in Russia. *Nobles' Nest* shows the pitiable contrast between the life of the aristocratic class and that of the laborers. *Fathers and Sons*, *Virgin Soil* and *Smoke* are in the same realistic vein and place Turgenieff in the rank of the greatest masters of fiction. All of them, together with *On the Eve*, one of his earlier novels, have been translated in English.

TU'RIN, ITALY, capital of the province of Turin, is situated on the River Po, at its confluence with the Dora Riparia, seventy-six miles southwest of Milan. It occupies a beautiful site in the midst of a plain surrounded by mountains, and is one of the most attractive towns in the north of Italy. The streets cross each other at right angles, and the city's activities center at the Piazza Castello, on which are the Madama Palace, an old castle built in the Middle Ages, and a royal palace, which dates from the middle of the seventeenth century. Other buildings of interest are the cathedral, dating from the fifteenth century; the Church of San Dominico, dating from the fourteenth century, and the Royal Burial Church, located on a hill east of the city. A building known as the Mole Antonelliana, resembling a tower and surmounted by a gilded statue 538 feet above the ground, was erected to the memory of Victor Emmanuel II and is used as a museum.

The University of Turin, founded in 1405, is located here; also a royal polytechnic school, military schools and a national library with 350,000 volumes. Turin is an important city, industrially and commercially. Its manufactures include silks, lace, velvet, ribbons, cotton and woolen goods, machinery,

iron and steel products, porcelain ware, musical instruments, jewelry and chocolate. It was the capital of Italy from 1861 to 1865. Population, 1911, 427,106; in 1915, estimated at 451,994.

TURKESTAN, *toor ke stan'*, a large area in the interior of Asia, extending to Siberia and Mongolia on the north, to the Gobi Desert on the east, to Tibet, India and Bokhara on the south, and to the Caspian Sea on the west, with somewhat indefinite boundaries. The region is divided politically into Eastern, or Chinese, Turkestan, and Western, or Russian, Turkestan.

Chinese Turkestan. This region, which is a dependency of China, covers an area of 550,350 square miles and has a population of mixed Turkish and Aryan descent, estimated at 1,200,000. The climate is severe and extremely dry, the oases and strips at the foot of the mountain ranges being the only parts permanently habitable. The chief products are wheat, millet, oil-seeds and cotton. Hemp, flax and dye plants are raised, and grapes, melons, pomegranates and some other fruits ripen. The mulberry tree thrives, and considerable silk is produced. Stock raising is the chief industry, and large herds of horses, camels, sheep and cattle are raised, many of which are exported.

The great caravan route from Peking to Siberia passes through this country, following a line of oases.

Russian Turkestan. This region includes the territories of Samarkand, Ferghana, Syr-Darya and Semiryetchensk, extending west from Eastern Turkestan to the Aral Sea and the Caspian. The population of over 5,000,000, is made up of Turkomans, Kirghizes and Russians. The eastern portion is high, and the surrounding mountains are crowned with perpetual snow; but toward the west the surface descends rapidly, until at the Caspian Sea it is eighty feet below the Mediterranean. The climate is subject to extremes of heat and cold. During the rainy season the surface is covered with a growth of vegetation, which reaches maturity rapidly.

Wheat, barley, rice, sugar cane, melons and garden vegetables, as well as fruits of various sorts, are raised in paying quantities wherever water can be obtained. The country is traversed by a number of caravan routes, and the Trans-Caspian railway connects the important towns with one another and with centers of trade in Russia.



TURKEY, the name of a decadent empire, which went down to defeat with Germany in the World War, and suffered the well-deserved fate of dismemberment. No voices were raised to plead the cause of Turkey when it sent its envoys to the peace conference. Crimes against its subject peoples which no other nation in history has duplicated turned humanity against the dying monarchy, whose history has been a series of adventures in oppression, corruption and misrule.

For generations Turkish affairs had caused uneasiness, and alarm at times, in all the capitals of Europe. The position of that country, its alliances, its fanatical religion, made it a difficult neighbor; clashing ambitions of the great powers, each of whom hoped to profit by Turkey's downfall, inspired the sultan with an arrogance and independence which was a source of constant irritation. The sultan had long been called "the sick man of Europe," a phrase expressing the tottering condition of his realm.

A Disappearing Empire. The Turkey with which the present generation is familiar was known as the Ottoman Empire, and was so called from Othman, or Osman, its founder, who, about the year 1300, reared an independent kingdom in Asia Minor upon the ruins of the Seljuk Turkish power. His followers were a tribe that had swarmed out of Central Asia about fifty years before.

The spirit of conquest was strong in these early Ottoman Turks, and gradually they subjugated the Armenian peoples, absorbed the dependencies of the Eastern Roman, or Byzantine Empire, and fought their way into South Central Europe, and Africa. In the sixteenth century, when the power of the Ottoman Turk was at its height, the empire included Arabia and the Asiatic possessions of the fallen Byzantine Empire, including Constantinople; Macedonia, Greece, Albania, Serbia, the provinces that became modern Rumania, Bulgaria, the Greek Mediterranean islands, Syria, Tripoli and Egypt. The Ottomans even gained a foothold in Hungary

and in Italy, but in the seventeenth century the tide began to turn against them, and after 1683, when John Sobieski of Poland raised the siege of Vienna, they were gradually pushed out of Europe. One by one the European provinces of Turkey gained their independence and became free nations or were absorbed by other European powers. In 1912 Italy by a successful war wrested Tripoli from Turkey, and at the close of the Balkan Wars, in 1913, the empire was shorn of all its European holdings except Constantinople, Adrianople, a small section adjoining these cities and a few islands in the Mediterranean.

Then came the World War. Even with the losses it had suffered in 1914 the Turkish Empire at that time covered more than 710,000 square miles of territory, exclusive of Egypt, where the sultan still exercised nominal authority.

Changes During the World War. Early in the World War the British annexed the island of Cyprus, and in 1915 declared Egypt a British protectorate. In 1916 the people of Hedjaz, a narrow strip of territory in Arabia, bordering on the Red Sea, revolted and set up an independent kingdom; this state has an area of 96,500 square miles and a population of 300,000. In 1917 Palestine was captured by the British, and by the end of the war all of Syria was under allied control. Mesopotamia fell into British hands in 1917, and when Turkey surrendered in the fall of 1918 practically Constantinople only was left to the Turk in Europe.

Turkey Dismembered. The only section of the old empire which is dominantly Turkish is the peninsula at the western extremity of Asia, known as Asia Minor, or Anatolia. This territory is between 193,000 and 200,000 square miles in extent, and has a population of about 10,000,000. It is composed of the vilayets (provinces) of Brussa, Smyrna, Konia, Angora, Adana, Sivas, Trebizond and Rastamuni. There are also two small subdivisions, Ismid and Bigha. According to the principle of self-determination of peoples, it was generally agreed by the allies that most of this nucleus of the old empire should remain under Turkish control, but the disposition of the other parts of the domain occasioned much discussion.

The following program may be regarded as typical of the plans proposed: That Turkey in Europe, excepting Constantinople,

be divided between Greece and Bulgaria; that Constantinople be left under the nominal suzerainty of the sultan (in recognition of the religious feelings of the Mohammedans throughout the world), but that it be controlled directly by an international commission; that various sections of Arabia be united into an Arab state under the rule of the king of Hedjaz, whose alliance with the allies foiled the kaiser's plan of starting a holy war of the Mohammedans; that the islands off the west coast of Anatolia be ceded to Greece; that Armenia be an independent

would be settled by the League of Nations when it began functioning.

Turkey and Its People. The discussion which follows is restricted to the genuinely Turkish portion of the old empire, namely, Anatolia, or Asia Minor. (For descriptive matter on the various parts of the former domain, see ARMENIA, ARABIA, PALESTINE, SYRIA, MESOPOTAMIA, EGYPT, etc.) *Anatolia* is derived from Greek words meaning *to rise*, a word chosen with reference to the elevated surface, and is the modern name for Asia Minor. The country includes the



TURKEY OF THE FUTURE

The black area in Asia represents the only territory left under the undisputed sway of the sultan; the black area in Europe may be separated entirely from the realm of Turkey; that question is to be determined by the league of nations. The heavy boundary line marks the limits of the empire in 1914.

state under the guardianship of one of the allies, preferably America; that Palestine be a separate state under British or international protection; that Syria be made a French protectorate, and that Mesopotamia be independent, but under British protection.

Certain sections of Anatolia along the coast were claimed by Greece, Italy and France. The final decision on these points and on the exact boundaries of the various states to be erected had not been reached when the peace treaty with Germany was signed; it seemed probable that many of the points

peninsula bounded by the Armenian highlands on the east, Syria and the Mediterranean on the south, the Aegaen Sea on the west, and the Black Sea and Sea of Marmora on the north. In the interior the land is a series of plateaus, having an average elevation of 3,000 feet. Near the Mediterranean seacoast these uplands suddenly sink to the narrow belt of level land called the *Levant*. The plateaus are nearly bare of trees and are interspersed with salt plains, marshes and salty lakes. The land is here best adapted for grazing. Under irriga-

tion, however, the soil is productive. The strips of seacoast on the west, north and south are fertile and bear a luxuriant vegetation, including such fruits as prunes, olives and figs. Farming is practiced in the interior with considerable toil, and grains, cotton and tobacco are raised. Silk culture also receives attention.

The plateau is bordered on the north by a series of parallel mountains which run the whole length of the Black Sea. The greatest elevation, in the extreme east, is 12,000 feet. On the south is the Taurus range, following the Mediterranean coast, and having many peaks over 10,000 feet in height. These mountains are rich in minerals, but the mines have as yet been little developed. The mineral deposits of Anatolia include coal, lead, manganese, iron, gold, salt and petroleum, and they offer a promising field for capitalists when normal conditions return.

In Anatolia, as in other parts of the old Turkish domain, industry has long been in a backward state. The rural population which lives chiefly by farming and sheep raising, has suffered from misgovernment, lack of transportation facilities ignorance and extortion of tax officials. Manufacturing in the modern sense is almost unknown, but Turkish artisans show great skill in producing copper and brass utensils, and, especially, hand-woven rugs. Cloth, olive oil and soap are made in limited quantities.

The Turkish peasants are naturally patient, hospitable and kind-hearted; it is the unscrupulous deeds of the ruling classes that have given rise to the feeling in Western nations expressed in the term, the "Unspeakable Turk." The Turkish people are all Mohammedans in religion, and are devoted followers of the Prophet. They are found in all parts of the old empire, both in Europe and Asia, but are nowhere numerically dominant except in Asia Minor. In the cities Greeks, Jews and Armenians are important in commercial life, but Turks have political control. Nomadic Turkomans, who are racially akin to the Turks, are found in the rural districts in large numbers. The chief cities include Smyrna, Scutari, Brussa, Adana, Trebizond and Adalia.

History of the Empire. The Ottoman Turks came originally from the region of the Altai Mountains, in central Asia, and in the sixth century A. D. they pushed onward to the west, in connection with other Turkish

tribes. Early in the eighth century they came in contact with the Saracens, from whom they took their religion, and of whom they were at first the slaves and mercenaries. In the thirteenth century they appeared as allies of the Seljukian Turks against the Mongols, and for their aid they received a grant of lands in Asia Minor. Othman or Osman, the son of their leader, Ertogrul, became the most powerful emir of Western Asia, and after the death of the Seljuk sultan of Iconium in the year 1300, he proclaimed himself sultan. Thus was founded, upon the ruins of the Saracen, Seljuk and Mongol power, the Empire of the Osman, or Ottoman Turks, in Asia. After Osman, the courage, policy and enterprise of eight great princes, whom the dignity of caliph placed in possession of the standard of the prophet, and who were animated by religious fanaticism and a passion for military glory, raised the Empire to the rank of the first military power, in both Europe and Asia (1300-1566).

Period of Expansion. The first of these princes was Orkhan, son of Osman. He subdued all Asia Minor to the Hellespont and was the first to organize the Turkish power. Orkhan's son, Soliman, first invaded Europe in 1355. In 1361 Orkhan's second son and successor, Amurath I, took Adrianople, which became the seat of the empire in Europe, and he later conquered Macedonia, Albania and Serbia and defeated a great Slav confederation, under the Bosnian king Stephen, at Kossovo. Bajazet (ruler from 1389 to 1402) invaded Thessaly and advanced toward Constantinople. In 1396 he defeated the Western Christians under Sigismund, king of Hungary, at Nicopolis, in Bulgaria; but at Angora, in 1402, he was himself conquered and taken prisoner by Timur, who divided the provinces between the sons of Bajazet. Finally, in 1413, the fourth son of Bajazet, Mohammed I, seated himself upon the throne of Osman. Mohammed was succeeded by his son, Amurath II (1421-1451), who defeated Ladislás, king of Hungary and Poland, at Varna in 1444. Mohammed II, the son of Amurath, completed the work of conquest (1451-1481). He attacked Constantinople, which was taken on May 29, 1453, and the Byzantine Empire came to an end. After that time Constantinople was the seat of the Sublime Porte, or Turkish government. Mohammed added Serbia, Bosnia, Albania

and Greece to the Ottoman Empire, and threatened Italy, which was freed from danger by his death. His grandson, Selim I (Sultan from 1512 to 1520), conquered Egypt and Syria. Under Solyman II (1520-1566), the Ottoman Empire reached the highest pitch of power and splendor, but after his time, the race of Osman degenerated, and the power of the Porte declined.

Period of Decline. During the latter part of the sixteenth century and most of the seventeenth century, the chief wars which Turkey waged were with Venice and with Austria. The Battle of Lepanto in 1571, in which the Ottoman fleet was overthrown by the combined fleets of Venice and Spain, was the first great Ottoman reverse at sea; and the Battle of Saint Gotthard, in 1664, in which Montecuccoli defeated the Vizier Kiuprili, the first great Ottoman reverse on land. In 1683 Vienna was besieged by the Turks, but it was relieved by John Sobieski, and in 1697 the Turks were defeated at Zenta by the Austrians under Prince Eugene. Two years after this defeat, the Peace of Karlowitz was signed, by which Turkey agreed to renounce its claims upon Transylvania and a large part of Hungary, to give up the Morea to the Venetians, to restore the Ukraine to Poland and to leave Azov to the Russians. Eugene's subsequent victories at Peterwardein and Belgrade obliged the Porte, by the Treaty of Passarowitz, in 1718, to give up Belgrade, with a part of Serbia and Wallachia; but the Turks, on the other hand, took the Morea from Venice, and by the Treaty of Belgrade, in 1739, they regained Belgrade, Serbia and Little Wallachia, while for a time they also regained Azov.

Russia, which had been making steady advances under Peter the Great and subsequently, now became the great opponent of Turkey. In the middle of the eighteenth century, the Ottoman Empire still embraced a large part of southern Russia. The victories of the Russians in the war between 1736 and 1744 determined the political superiority of Russia, and compelled Turkey to renounce all sovereignty over the Crimea, to yield to Russia the country between the Bog and the Dnieper and to open its seas to the Russian merchant ships. By the Peace of Jassy, 1792, which closed the war of 1787-1791, Russia retained Tauride and the country between the Bug and the Dniester and gained some accessions in the Caucasus.

In the long series of wars which followed the French Revolution, the Ottoman Empire was first opposed to France, in consequence of Bonaparte's campaign in Egypt, and later to Russia, which demanded a more distinct recognition of its protectorate over the Christians. By the Peace of Bucharest in 1812, Turkey ceded to Russia the country between the Dniester and the Pruth. Further disputes ended in the Porte making additional concessions, which tended toward loosening the connection of Serbia, Moldavia and Wallachia with Turkey. In 1821 the war of Greek independence broke out. In 1826 the massacre of the Janizaries took place at Constantinople, after a revolt. In 1828 the Russians crossed the Balkans and took Adrianople, the war being terminated by the Peace of Adrianople in 1829. In 1831 Mehemet Ali, nominally pasha of Egypt, but real ruler both of Egypt and Syria, levied war against his sovereign and threatened Constantinople; but the Russians, who had been called on for aid by the sultan, forced the invaders to desist. In 1839 Mehemet Ali again rose against his sovereign; but through the active intervention of Austria, Great Britain and Russia, he was compelled to evacuate Syria, though he was recognized as hereditary viceroy of Egypt.

The next important event in the history of the Ottoman Empire was the Crimean War. In 1875 the people of Herzegovina, unable to endure longer the misgovernment of the Turks, broke into rebellion. A year later the Serbians and Montenegrins likewise took up arms, and though the former were unsuccessful and obliged to abandon the war, the Montenegrins still held out. Meantime, the great powers of Europe were pressing reforms on Turkey, and at the end of 1876 a conference met at Constantinople, with the view of making a fresh settlement of the relations between Turkey and the Christian provinces. All the recommendations of the conference were, however, rejected by Turkey; and in April following, Russia, which had been coming more and more prominently forward as the champion of the oppressed provinces and had for months been massing troops on both the Asiatic and the European frontier of Turkey, issued a warlike manifesto and commenced hostile operations in both parts of the Turkish Empire. The final settlement of this war was effected by the Treaty of Berlin.

The main events in the history of the Ottoman Empire from the Treaty of Berlin to the year 1890 were the treaty with Greece, executed under pressure of the great powers in 1881, by which Turkey ceded to Greece almost the whole of Thessaly and a strip of Epirus; the occupation of Egypt by Great Britain in 1882, and the revolution at Philippopolis in 1885, when the government of Eastern Rumelia was overthrown, and the union of that province with Bulgaria was proclaimed. In July, 1894, Constantinople was visited by a series of earthquakes, which lasted eight days, two or more occurring each day. Great damage was done to the city and surrounding country, and hundreds of people were killed.

For a number of decades the Turkish government had frequent revolts to deal with. The massacres occasioned by these uprisings aroused the sympathy of America and Europe, but the European powers would not interfere because it was believed that such interference might cause a general upheaval in Europe. In July, 1908, the Young Turks succeeded in a revolution which compelled the sultan to grant a constitution. The first Parliament under this constitution met in 1909. In April the troops in Constantinople revolted against the Young Turks, but troops from the country near by rushed to the capital, and gained control of the city. Abdul Hamid was compelled to abdicate, and his younger brother, Mohammed Rechad Effendi, ascended the throne with the title of Mehmed, or Mohammed V. In 1912 Turkey lost Tripoli to Italy, resulting from a war of aggression on the part of the latter. Hardly had peace been arranged between Italy and Turkey, when the war against Turkey was declared by the allied Balkan states. After several months of warfare the European powers interfered to end the struggle, and on May 30, 1913, Turkey accepted the terms of the Treaty of London. In October, 1914, Turkish warships bombarded the Russian port of Odessa, probably as the result of an agreement with Germany. This act, after reparation was refused, was accepted by Russia and its allies as a cause for war.

The World War and Its Effects. (See WORLD WAR, for military operations). Turkey's mistreatment of the Armenians, nearly two million of whom were massacred or deported (see ARMENIA, for report of American Relief Committee), was a blot on

Turkey's record, and abhorrent to all nations. In October, 1918, Turkey surrendered to the Allies, and the Ottoman Empire came to an end. Mohammed V died late in 1918, and was succeeded by his son, Mohammed VI, who remained in Constantinople, which came under control of the Allies, while the Great National Assembly (convened in April, 1920) sitting at Angora exercised the functions of a parliament, as well as of supreme executive authority, in the *de facto* government set up by Mustapha Kemal Pasha. Until the fall of 1922, this government controlled all of Asia Minor not in foreign occupation. In the fall of 1922, following clashes with Greek forces inland from Smyrna, the Turkish army under Kemal Pasha defeated the Greeks and captured Smyrna, recovering this section of Asia Minor which had been awarded to Greece after the Great War. Kemal Pasha followed up this victory by demanding the return of Constantinople, including control of the straits, and of part of Thrace to Turkish control.

Related Articles. Consult the following titles for additional information:

CITIES

| | |
|----------------|-----------|
| Adrianople | Smyrna |
| Constantinople | Trebizond |

HISTORY

| | |
|---------------------|-------------------|
| Abd-ul-Hamid | Gallipoli |
| Balance of Power | Mohammed V |
| Balkan Wars | Russia |
| Berlin, Congress of | Russo-Turkish War |
| Bosporus | Seljuks |
| Byzantine Empire | Solyman II |
| Crimean War | World War |
| Dardanelles | |

TURKEY, a large game bird of the pheasant family, native to North America. There are only two species; one is found in Yucatan and Central America, and the other is the common wild turkey of Mexico and the United States. The wild turkey is a tall, handsome bird, the full-grown male weighing from ten to twenty-five pounds. The brilliant plumage has copper, bronze and green reflections. The head and neck are bare of feathers. The male, which is larger than the female, has a tuft of bristly feathers hanging from its breast. These birds feed on insects, seeds, berries and other small fruits. The nests are placed on the ground, and the eggs, twice the size of a hen's egg, are creamy white. One brood, usually consisting of about twelve, is reared a season. A second brood is raised only in case the first comes to grief. The birds are becoming rapidly exterminated. The domestic

turkey, which is derived from the Mexican wild turkey, is less brilliantly colored. Turkeys require about the same care as chickens. See GAME, color plate.

TURKEY BUZZARD, or **TURKEY VULTURE**, the commonest of American vultures, so named because at a distance it resembles a turkey in appearance. The turkey buzzard is about two and a half feet long, and its wings extend to about six feet in breadth. It lives in most of the warmer regions of the United States and extends its habitat through Mexico and South America. See VULTURE.

TURKS, a race of Mongolo-Talei origin, widely disseminated throughout Western and Northwestern Asia and Southeastern Europe. They are divided into the Ottoman Turks, Turkomans, Kirghizes, Usbecks, Yakuts and other tribes. The Ottoman Turks developed in the Middle Ages to commanding military and political power, but have since greatly declined.

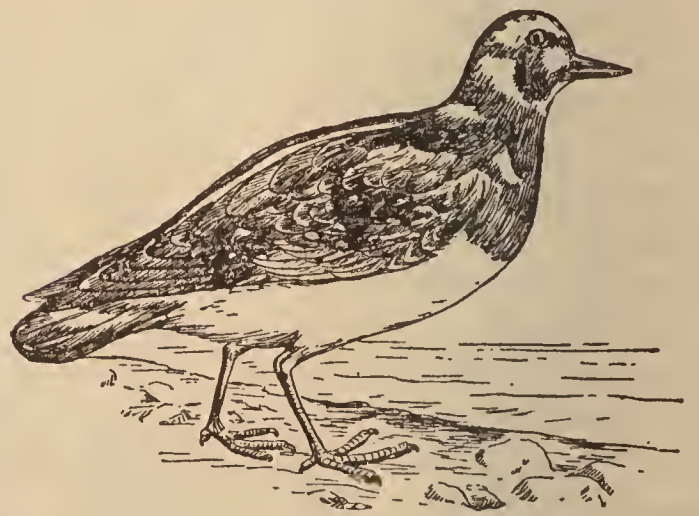
TUR'MERIC, an aromatic plant, native to Southern Asia; also a yellow dye prepared from its roots. Turmeric is used as a condiment in the Orient, being an important ingredient in curry powder. It is also useful in chemistry, in making test papers.

TURN'ER, JOSEPH MALLARD WILLIAM (1775-1851), an English landscape painter, member of the Royal Academy, first celebrated as a landscape painter in water colors and later in oils. In the first half of the nineteenth century he exhibited at the Academy more than two hundred pictures, easily becoming the most popular landscape painter of the English school. His works claim special merit because of their fine coloring effects. Details are often wanting, and drawing is imperfect, but the idealistic effect is unsurpassed. During the latter period of his work, however, he fell into a vague trifling with effects of light and shade and color, which somewhat lessened his great reputation. He bequeathed most of his pictures and sketches to the nation, on condition that a suitable building be erected for their reception. They have been placed in the Turner Gallery, occupying two rooms in the National Gallery in London. Some of his most noted paintings are *Slave Ship*; *The Fighting Temeraire*; *Rain, Steam and Speed on the Great Western Railway*; *Hannibal and His Army Crossing the Alps*, and *The Garden of the Hesperides*.

TURNER, NAT (about 1800-1831), an American negro slave, born in Southampton County, Va., who from earliest childhood claimed to be chosen and inspired for the accomplishment of a great purpose. In 1828, he declared that at a certain sign he would lead an insurrection against his enemies. In 1831, at an eclipse of the sun, he began carrying out this plan by killing five members of his master's family. Joined by other slave recruits, he continued the massacre until every person in the neighborhood had been murdered. On the following day the insurrection was broken up by a band of white men and by the arrival of Federal troops. Turner was captured October 30 and executed within a few days. The insurrection, known as the Nat Turner Insurrection, resulted in the passage of stringent laws for the management and punishment of slaves in most of the Southern states.

TUR'NIP, a biennial plant of the mustard family, much cultivated on account of its fleshy root. It was well known to the Greeks and Romans, and has been used as a vegetable in all temperate climates, being cultivated on a large scale in some countries as food for stock. Turnips may be planted succeeding the harvest of a crop of wheat or oats.

TURN'STONE, a shore bird of the plover family, with pied black and white plumage,



TURNSTONE

varied with rufous and ash, taking its name from its habit of turning up small stones in search for marine worms, minute crustaceans, etc., for food. It is found in almost every part of the globe during migrations, and breeds on rocky coasts in the Arctic regions, cunningly concealing its eggs, four in number, among the sparse Arctic vegetation.

TURNVEREIN, *toorn' ferine*, German athletic organizations first established by Friedrich Ludwig Jahn about the beginning of the nineteenth century, and exerting an

enormous influence in building up a vigorous and hardy German population after the Napoleonic wars. In America turnvereins were first organized by German refugees in Philadelphia and Cincinnati, in 1848. They were subsequently extended to other cities with large German populations, the total membership attaining to about 40,000.

TUR'PENTINE, the distilled gum of the pine tree. Turpentine is manufactured by collecting the gum, or crude turpentine, from the trees and distilling it in copper vessels. The season begins when the first spring sap rises, and it ends when winter checks the flow of the sap. In January or February the trees are hacked. The hacks are about six inches deep; they are cut near the roots of the tree, and as close together, to the height of a man's head, as can be done without killing the pine. The hacker leaves a width of bark between each cut, so as to preserve the vitality of the tree. The sap or gum, fills the cuts with a clear, sticky, thick fluid, and this is removed with a dipper. The sap is deposited in barrels, which are scattered through the woods. The first sap which flows in the spring makes the best resin, and the poorest is the product of the hardened gum which is left on the sides of the cuts. This is removed by the *scraper*, who moves through the woods gathering the leavings.

The still is a copper vat, hooded, with a close-fitting, air-tight cover, in which is a funnel, which, in turn, is connected with the *worm* of the still (see DISTILLATION). This worm runs down into another vat, near at hand, and in this vat the fumes, or vapor, of the heated gum are distilled into turpentine. Fire under the copper vat heats the gum, and the volatile parts rise to the funnel, pass into the still and are condensed by the water in the second vat into spirits of turpentine. The residuum left in the vat is the rosin of commerce, which is passed through a series of strainers and sieves to the barrels, which are made on the spot. The turpentine cannot be barreled so easily, for it will work through an ordinary barrel. It is placed in white pine barrels, which have been coated inside with several coats of strong, hot glue, which keeps the turpentine from soaking into the wood. The trees are worked for five or six seasons. All the turpentines dissolve in pure alcohol, and by distillation they yield oils, which are termed *spirits of turpentine*. Oil, or spirits, of turpentine is used to a

limited extent in medicine. It is also much used in the arts, for dissolving resins and oils in making varnishes. See RESINS; ROSIN.

TURQUOISE, *tur'koiz*, a precious stone, of beautiful blue or green color due to the presence of copper. It is capable of taking a high polish, and has long been a favorite gem in the East, especially in Persia, where the finest specimens are found. When exposed to fatty acids, the turquoise loses its color and turns greenish, thus leading to the Oriental superstition that its dullness foretells misfortune. *Bone turquoise* is an imitation turquoise, composed of fossil bone.

TURTLE, a name given to reptiles that differ but little from tortoise; in fact, *turtle* is the name commonly given to both forms. The shell which encloses the body of the turtle is in two parts, the upper portion called the *carapace*, the lower, the *plastron*. Turtles have no teeth, but the jaws have a tough, horny skin. The food of some turtles is marine plants; others feed on insect larvæ, fish and mollusks. They deposit their eggs usually in holes in sandy places, cover them with sand, and leave them to be hatched by the warmth of the sun. The young begin to crawl on leaving the egg, and soon find water. Turtles are found in the seas of warm climates, and in many inland lakes and rivers. The most important species is the *green turtle*, which is from six to seven feet long and weighs from 700 to 800 pounds. It is found in the West Indies, and is brought to the United States for its food value. Its flesh is highly esteemed as a table luxury.

Mud Turtle, the name commonly applied to small turtles of aquatic habits which prowl about the muddy bottoms of rivers and ponds in search of food. The common mud turtle is about four inches long, dull olive or brown above and yellow or pale brown below. Other species include the *Louisiana*, the *yellow-necked* and the *Mexican*.

Related Articles. Consult the following titles for additional information:

| | | |
|-------------|-----------------|----------|
| Leatherback | Terrapin | Tortoise |
| | Snapping Turtle | |

TURTLE DOVE, *duv*, a small European pigeon, pale grayish-brown in color, marked with a darker hue above and with a purple tinge on the feathers of its breast. Its cooing note is plaintive and tender. Its nest is loosely built in the crotch of a low tree or bush. The eggs are creamy-white, and are two in number. The similar North American species is known as the *mourning dove*.

TUSCALOOSA, *tus ka loo'sah*, ALA., the county seat of Tuscaloosa County, fifty-six miles southwest of Birmingham, is in a rich cotton-growing and coal-mining region. The chief industrial establishments are cotton gins and compresses, iron works, lumber and flour mills, machine shops and creameries. The University of Alabama is just a mile north of the city, and there are numerous other educational institutions of high standing. The city was the capital of the state from 1826 to 1846 and the old capitol building is still a feature of interest. The place was settled in 1812 and incorporated in 1816. The commission form of government was adopted in 1912. Population, 1920, 11,996.

TUSCANY, *tus' ka ni*, a small department or province of Northern Italy. It comprised ancient Etruria, and the Etrurians (Etruscans) were the earliest known inhabitants of the peninsula. They became subject to Rome in the fourth century B. C. During the period of barbarian migrations they were overcome in turn by the Ostrogoths, the emperors of Constantinople and the Lombards. In the Middle Ages several of the cities of Etruria, notably Florence, Pisa and Genoa, became independent and prosperous, and in the latter half of the sixteenth century the Florentine possessions were formed into the Grand Duchy of Tuscany. From 1745 to 1859 Tuscany was under the rule of Germany; in 1861 it became by vote of its population a part of the kingdom of Italy.

Among the noted names of natives of Tuscany are the Medici, Giotto, Boccaccio, Dante and Petrarch. The dialect of Tuscany became the classical language of Italy.

TUSCARORA, *tus ka ro'rah*, a migrating Iroquoian tribe, which finally settled in New York and was received as a sixth member in the confederacy. See FIVE NATIONS, THE.

TUSKEGEE, *tus ke'ge*, **NORMAL AND INDUSTRIAL INSTITUTE**, an industrial school for negroes, established in 1881 by the state legislature at Tuskegee, Ala. It began its sessions in a small church, and the thirty pupils were all taught by Booker T. Washington. The institution has enjoyed wonderful prosperity, and now owns 2,300 acres of land, scores of buildings and much valuable equipment. In 1918 a fund of \$7,000,000 was awarded it from the Russell Sage estate. There are about 1,600 students and a faculty numbering about 200. Until his death in 1915, Booker T. Washington continued as

head of the school, and to him is due much of the credit for its marvelous growth.

The object of the institute is to furnish its students with an education fitting them to become proper leaders of the people of their own race, and thus to bring about better moral and material conditions. The studies of the academic department are closely associated with the practical work in the shops and fields. See WASHINGTON, BOOKER T.

TUS'SOCK MOTH, a family of moths named from the tufts of hairs, often brightly-colored, appearing in the caterpillars. The moths are dull-colored, and the females of some species are wingless. Several varieties of this moth are very destructive to fruit, and shade trees, and forest trees, notable among these being the *gypsy moth*, the *browntail moth* and the *white-marked tussock moth*. Of the latter there are two or three generations each summer, and the young caterpillars are extremely voracious. Trees are protected against these moths by winter pruning and burning of the cocoons, and by summer spraying and banding of trees. See GYPSY MOTH.

TUT-ANKH-AMEN, a pharaoh (or king) of ancient Egypt, who reigned about 1,400 B. C. The finding of his tomb in the Valley of Kings, near Thebes, is called the greatest archeological exploit of modern times. The expedition which discovered and opened this tomb was led by Lord Carnarvon of England, and Howard Carter, an American archeologist. The tomb and contents were opened and revealed to the world in 1923. Rare and priceless relics were disclosed.

TWAIN, MARK. See CLEMENS, SAMUEL LANGHORNE.

TWEED, a twilled wool or wool-and-cotton fabric for men's wear, with an unfinished surface and of two colors, usually combined in the yarn. It is largely manufactured in Southern Scotland and takes its name from the Tweed River, along which it was first made.

TWEED, a river of Great Britain, ninety-five miles in length, rising in the southeastern part of Scotland and flowing easterly and northeasterly into the North Sea. The lower part of its course forms a part of the boundary between Scotland and England.

TWEED, WILLIAM MARCY (1823-1878), an American politician, notorious as the leader of the famous "Tweed Ring" in New York City. As a member of the famous

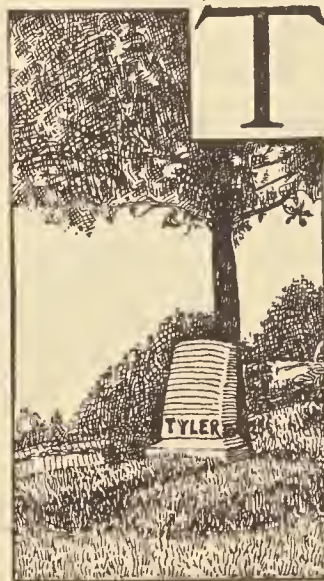
Tammany Hall, he gained immense influence and with the help of several unscrupulous supporters formed a combination for the political control of New York City. By the bribery of legislators and judges, bills were passed and decisions rendered which allowed the ring to carry out vast schemes of improvement, through which, by the padding of pay rolls and the auditing of fraudulent bills, they gained immense wealth. The régime lasted for more than six years, during which time the debt of the city was increased from \$20,000,000 to \$101,000,000. Finally, in 1871, through an exposure by the *New York Times* and a vigorous prosecution under a committee led by Samuel J. Tilden, the ring was broken up. Tweed was twice tried, finally convicted and sentenced to twelve years' confinement in the penitentiary and a fine of more than \$12,000. He was released two years later on a legal technicality, but was immediately rearrested on a suit for damages to the amount of more than \$6,000,000. While confined in jail awaiting trial, he escaped and fled to Spain. Finally, being captured, he returned to America, where he died in jail.

TWELVE TABLES, LAW OF THE, the earliest written code of law among the Romans. According to tradition it was drawn up to appease the plebeians, who had complained that they were not getting justice from the patrician judges. In 451 B. C., ten magistrates, called *decemvirs*, were elected to draft the laws, and the following year they submitted these to the people. The laws were afterwards written on brass tablets and placed in the Forum, over the orator's platform, where everyone might read them. These laws formed the basis of Roman legislation for centuries.

TWILIGHT, *twi'lite*, the glow in the sky before sunrise and after sunset. Twilight is caused by the refraction of the sun's rays as they pass through the atmosphere. The evening twilight is brightest immediately after sunset and continues to fade until the sun reaches 18° below the horizon, when twilight ceases. The time required for the sun to reach this point varies in different latitudes. In the torrid zone, where the sun's path throughout the year takes nearly the same direction as the parallels, twilight is of short duration, but in summer its duration increases toward the Poles, and near the Arctic Circle it lasts all night.

TWILIGHT SLEEP, the name commonly applied to a method of applying anesthetics during childbirth. It originated at the hospital at Freiburg, Germany, and has been attempted, with varying success, in other countries. The Freiburg method consists in the administration of measured doses of morphine and scopolamine, these being given at specified intervals. Under ideal conditions, and when the method operates successfully, the patient comes out of the ordeal with no recollection of pain. Undoubtedly in successful cases the mother is greatly benefited by the method, as the elements of shock and exhaustion are reduced to a minimum. Twilight sleep has been tried in the best hospitals in America, but the results have not always been satisfactory. It is practicable in certain selected cases, but the proper conditions of light, quiet and attendance cannot be produced in the ordinary household, and it is declared that promiscuous adoption of the method would result in great harm.

TYCHO BRAHE, *te'ko brah'eh*, or *brah*. See BRAHE, TYCHO.



Grave, Richmond, Virginia.

TYLER, JOHN, (1790–1862), the tenth President of the United States, and the first “accidental” President, so-called because as Vice-President he succeeded automatically to the higher office through the death of the duly-elected executive.

Early Career. Tyler was a Virginian, born at Greenway, March 20, 1790, the son of John Tyler, Sr., who was at various times judge of state and Federal courts, speaker of the Virginia house of delegates and governor of the state. The future President was fortunate in his ancestry. By the time young Tyler was nineteen years of age he was a practicing attorney, and when twenty-one was a member of the state legislature, where he served for five consecutive terms, leaving that post only to go to Congress, to which he was elected in 1816, as a Democrat.

After two terms in Congress, he was returned to the state legislature in 1823, and two years later became governor of Virginia, the state promoting the son to the post with which it had once honored his father. After

two terms as governor, Tyler was elected to the United States Senate, in which body he took his seat in 1828.

Independence had been his chief characteristic in political life; though he was a Democrat, not always did he support the Democratic program. In the Senate the nation found him to be a stubborn man, who could not be moved from a position once deliberately taken. He came prominently into notice by opposing the tariff measurers of 1832 and 1833, and was the only Senator to oppose the Force Bill of 1832. He had supported Jackson for the Presidency, but in 1834 made a report censuring the President for removing deposits from United States banks. The Virginia legislature ordered him to vote to expunge the vote of censure, but this Tyler refused to do, and soon he resigned from the Senate and retired to private life.

He became a leading member of the new Whig party, and sought to have the party name him for the Vice-Presidency in 1836. This effort failed, but in 1840 a chain of circumstances gave this former Democrat the coveted office. He was nominated on the Whig ticket with William Henry Harrison, the choice of Tyler being largely attributed to the Whig desire to secure the votes of Democrats who were dissatisfied with the two preceding administrations, which had brought upon the country the panic of 1837. Harrison and Tyler received 234 electoral votes; the opposition, 60. On March 4, 1841, the new administration assumed control of the government, and on April 4 President Harrison died.

Tyler as President. There was a stronger man than Tyler in official Washington; this was Henry Clay, the acknowledged leader of the Whigs. Clay looked upon the Presidential election as a vindication of his course in politics; Tyler considered the result to be merely a rebuke of the preceding administration. There was soon a clash of factions, and Tyler, the President and nominal leader, broke with the party.

The incident which caused the breach was legislation respecting a second United States Bank. Tyler approved the abolition of the sub-treasury system, but would not consent to another United States bank, which Congress favored. Twice he vetoed a bank bill; after this second refusal to carry out the wishes of the party all the Cabinet resigned, with the exception of Daniel Webster, who

Administration of John Tyler, 1841-1845.

I. JOHN TYLER

- (1) Birth
- (2) Parentage
- (3) Education
- (4) Early career
- (5) Public life after breach with Jackson
- (6) Career after end of his term
- (7) Character
- (8) Death

II. GOVERNMENTAL AFFAIRS

- (1) Domestic
 - (a) President's quarrel with Whigs
- (2) Results
 - (a) Resignation of Cabinet
 - (b) Tyler read out of his party
- (3) Foreign
 - (a) Webster - Ashburton Treaty
 - (1) Negotiators
 - (2) Settled Maine boundary dispute
 - (3) Other settlements

III. INTERNAL AFFAIRS.

- (1) Dorr's Rebellion
 - (2) Patroon War
 - (3) The Mormons
 - (a) At Nauvoo
 - (b) In Utah
 - (4) Dedication of Bunker Hill Monument
 - (5) Construction of first telegraph line
 - (6) Discovery of copper
- Questions on Tyler**

When and where was John Tyler born?

What public offices did he hold before his inauguration as President?

What were Tyler's views on internal improvements?

Why did the Whigs resign from the Cabinet?

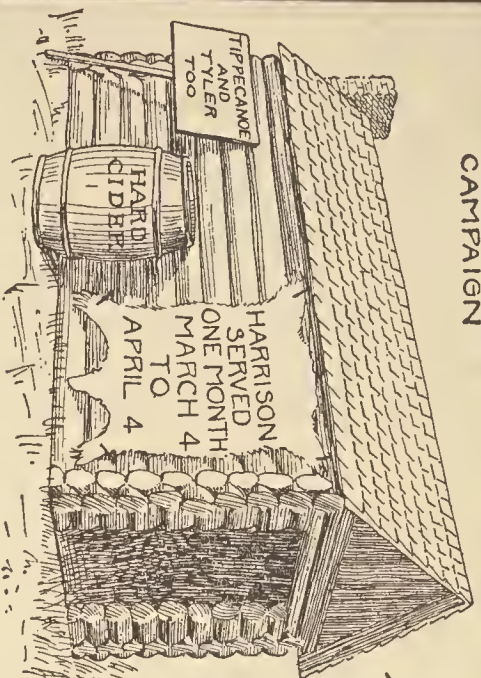
Why was the South anxious to annex Texas?

Who was Lord Ashburton?

What disputes did the Webster-Ashburton Treaty settle?

Explain Dorr's Rebellion.

LOG CABIN
CAMPAIGN

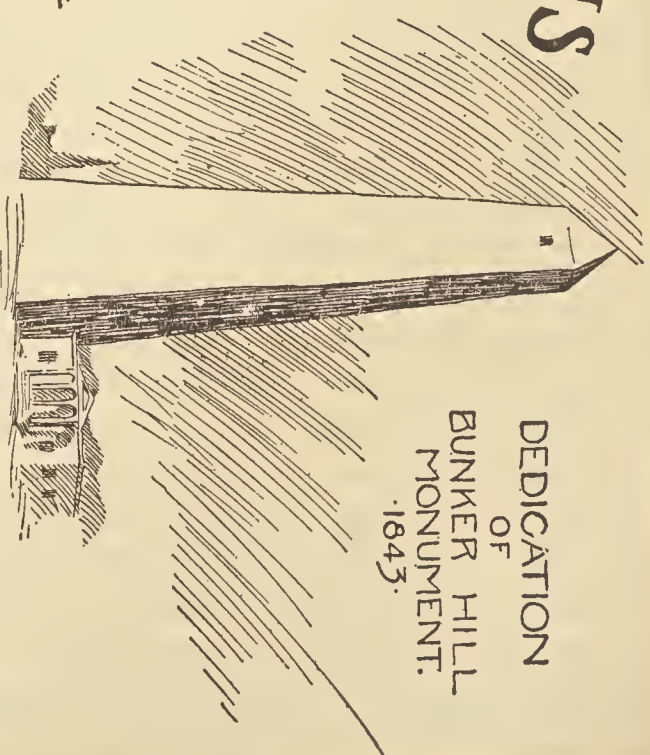


ADMINISTRATIONS OF HARRISON AND TYLER

1841

TYLER

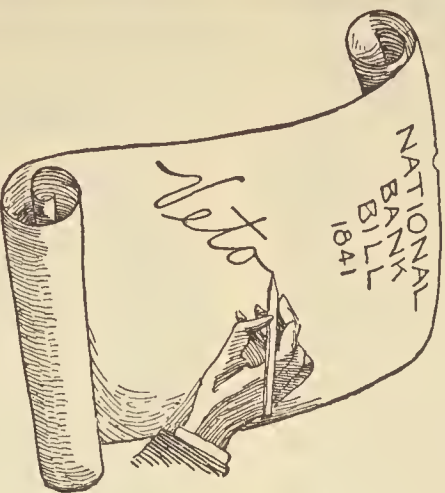
1845



DEDICATION
OF
BUNKER HILL
MONUMENT.
1843.



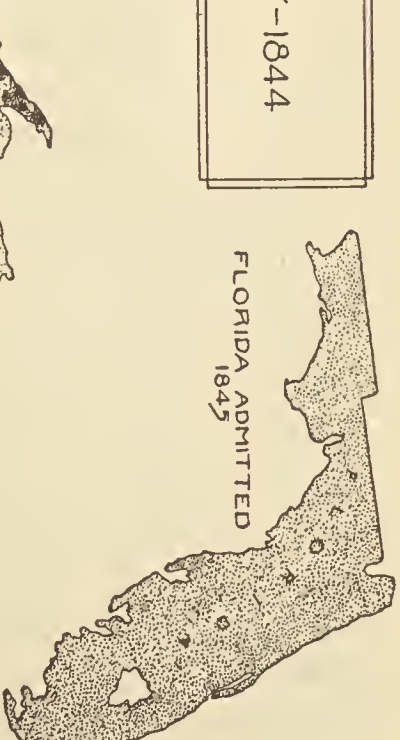
FIRST
TELEGRAPH LINE
1844



IMPORTANT EVENTS

DORR'S REBELLION - 1842.
SCREW PROPELLER INTRODUCED INTO U.S. NAVY - 1844
TROUBLE WITH MORMONS - 1844.

WEBSTER-ASHBURNTON
BOUNDARY TREATY.
1842



FLORIDA ADMITTED
1845



COPPER DISCOVERED
IN MICHIGAN
1844

wished to conclude the Webster-Ashburton Treaty, then the subject of negotiation.

Most of the Whigs thereafter refused to recognize Tyler as a party leader. The Democrats rallied to his support, however, and in the Congressional elections of 1842 they overthrew the Whig majority and established themselves in the House by a majority of sixty-one—a change of eighty-six votes.

Legislation for the remainder of the Presidential term was in part a matter of compromises; the Whigs did not again press the bank act, and on some measures they acted with the President. A protective tariff bill was passed. Two river and harbor bills were presented, one for the eastern part of the country and another for the western section, the former being vetoed and the other signed by Tyler, because it contained appropriations for the Mississippi River, which he believed would be a national, not a sectional, benefit. The Webster - Ashburton Treaty was one of the outstanding features of the administration. Texas was annexed to the Union on March 3, 1845, the day before Tyler's term ended. Other and minor events are listed in the accompanying outline.



JOHN TYLER

As Ex-President.

After his retirement from office Tyler spent several quiet years on his estate, three miles from his birthplace. The threat of civil war called him again into public life, and in February, 1861, he presided over a convention of the border states, held in Washington, D. C., and called to consider the situation presented by the secession of South Carolina. When Congress refused to accept the recommendations of the convention Tyler urged his own state to secede, and in the fall of 1861 he was elected to the Confederate Congress. In January, 1862, he died, and was buried in Hollywood Cemetery, Richmond. In 1914 Congress appropriated \$10,000 for the erection of a monument in his memory.

Related Articles. Consult the following titles for additional information:
Force Bills Webster-Ashburton
Harrison, William H. Treaty

TYLER, TEX., the county seat of Smith County, about 100 miles southeast of Dallas,

on the International & Great Northern and the Saint Louis Southwestern railroads. The city is the center of the fruit-growing region of Eastern Texas. It ships large quantities of cotton, fruit and garden products. Industrial establishments include railway shops, canneries, box and crate factories, ice works, an oil mill, mattress and overall factories and potteries. Tyler and East Texas colleges are located here. Noteworthy structures are a city hall, a Federal building, a Carnegie Library and a railroad hospital. The place was settled in 1846, and was chartered as a city in 1875. It adopted the commission form of government in 1914. Population, 1910, 10,400; in 1920, 12,085.

TYLER, WAT, an English soldier, in 1381 a leader of what is known as *Wat Tyler's Rebellion*. When a poll tax was levied on the already overburdened English people, riots broke out, and a mob, led by Tyler, marched on London, pillaging as it went. The young king, Richard II, rode out to meet the rebels. He promised to grant them charters of freedom and amnesty and many of them, satisfied, dispersed. But Tyler, growing bold and insolent, made further demands, and William Walworth, mayor of London, stabbed him. The liberties granted were soon revoked, but the movement had the effect of hastening the general tendency toward the abolition of villenage.

TYNDALE, *tin'dal*, WILLIAM (?-1536), an English reformer and translator of the Bible. He studied at Oxford and Cambridge and was ordained priest about 1521. Having made himself unpopular by the expression of certain heretical sentiments, he left England for the continent in 1524. After a visit to Luther at Wittenberg, he settled at Cologne, where he completed a translation of the New Testament, and on his expulsion from Cologne, he took refuge in Worms, where, in 1525, his translation was published. He translated the *Pentateuch* and the book of *Jonah*. When he openly opposed the divorce of Henry VIII from Catharine of Aragon, he was imprisoned in the castle of Vilvorde, near Brussels, and after a trial for heresy, he was strangled and his body was burned. In addition to the works mentioned, he wrote *The Obedience of a Christian Man* and *How Christian Rulers Ought to Govern*.

TYN'DALL, JOHN (1820-1893), an Englishman and one of the world's greatest physicists, was born at Leighlin Bridge. He

was largely self-taught, gaining his first scientific training as an ordnance surveyor and railway engineer.

After teaching mathematics at Queenwood College, he went to Germany for study and received a doctor's degree from the University of Marburg. He became a professor of natural philosophy at the Royal Institution in 1853, and on the death of Faraday was ap-



JOHN TYNDALL

pointed director. While he gave his chief attention to a study of radiant heat, he also made important experiments with light. In 1872 and 1873 he lectured in America.

Especially noteworthy was his effort to popularize science—to bring it within the reach of ordinary men. *Fragments of Science for Unscientific People*, *The Glaciers of the Alps* and *Hours of Exercise in the Alps* are among his "popular" writings. Other noteworthy books are *Heat as a Mode of Motion*, *Lectures on Light*, *On Sound* and *Contributions to Molecular Physics in the Domain of Radiant Heat*.

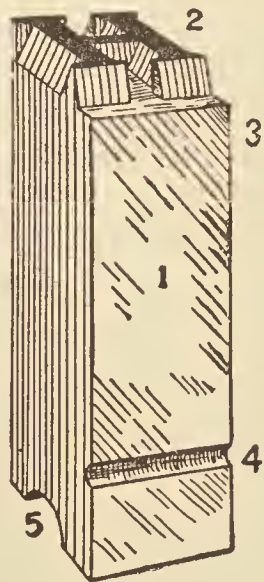
TYPE, a piece of metal, wood or other material, on one end of which is cast or engraved a letter, figure or other character. The earliest types were made of wood, and in style they resembled the script letters used in copying books before the invention of the art of printing. The parts of a type are (1) the body, (2) the face, (3) the shoulder, (4) the nick and (5) the groove. The *face* is that part that does the printing; the *nick* is to show the right side of the type when set, and the *groove* is to make it stand firmly on its base. In the early days of printing, each printer made his own type, but with the extension of the industry, type casting, or founding, became a business by itself. A few of the large types used in printing are still made of wood, but all others are of type metal, which is an alloy, consisting of three

parts of lead to one part of antimony, with a small quantity of tin and copper added.

Type are cast by machinery. A steel die, which is an exact pattern of the letter, is first made. This is driven into a piece of soft copper, so as to form a perfect impression of the letter. This is called the *matrix*. The matrix is then placed in a metallic box, called the *mold*. This is placed in the type-casting machine, which opens and closes the mold and fills it with type metal. The metal hardens instantly, and when the mold opens the type drops out. The face is then smoothed on a stone, and the body is nicked and grooved. The type are then tied up in packages, each of which contains only one kind of letter, and are ready for use. All types are ninety-two hundredths of an inch high.

A complete assortment of type is called a *font* and contains large and small capitals, small letters and italics, marks of punctuation and figures; in all, there are about 225 characters for English printing. The size of a font varies according to the work to be done with it. Small fonts contain from 500 to 800 pounds, and large ones have from 20,000 to 50,000 pounds. Type foundry have a rule for determining the number of different letters necessary to make each font complete. Z requires the smallest number. For every *z* there will be 46 *a*'s, 60 *e*'s, 32 *h*'s, 15 *m*'s, and so on.

There are thirteen sizes of type in ordinary use in printing books and newspapers. These are designated by special names and by the number of points they measure, a point being $\frac{1}{2}$ of an inch. Both methods of naming are given in the illustration.



A TYPE

| | |
|-------------------|----------|
| Nonpareil | 6-point |
| Minion | 7-point |
| Brevier | 8-point |
| Bourgeois | 9-point |
| Long Primer | 10-point |
| Small Pica | 11-point |
| Pica | 12-point |
| English | 14-point |

The smaller sizes are not used in general printing, although sometimes small Bibles are printed from $5\frac{1}{2}$ point, or agate, and still smaller sizes are used for marginal references in Bibles and other works. The type used in job printing is of various sizes, to suit the taste and conditions of the advertiser. See PRINTING.

TYPE SETTING MACHINES. See LINOTYPE; MONOTYPE.

TYPEWRITER, a machine for the rapid transcribing of letters, manuscripts, etc., as a substitute for handwriting. It was first successfully put into operation in 1875, and since that date has made its way into every kind of business house, court of law and governmental department where speed, accuracy and system in correspondence, the making of reports and tabulating of statistics are required. An average typewriter operator writes sixty words a minute, a rate three times that of a good penman, and the characters are much more legible. As women are the best operators of typewriters, the effect has been to bring thousands of them into the business world, where they have found opportunity to advance to responsible secretarial and executive positions.

The essential parts of the typewriter mechanism are a set of types; an arrangement of keys, for bringing the types in contact with the paper; a paper carrier, or carriage; a platen, or roller, against which the types strike, and an inking device. While there are many patterns of typewriters, from the earliest "Remington" to the latest make, full of new devices, all belong to two classes, those known as the *basket* machines and those known as *cylinder* machines. In the basket machines, each type is on the end of a bar, hung on a pivot and joined to its respective key by a lever attachment. These type bars are attached to a frame which was formerly circular, forming the basket from which the machine takes its name. In modern machines the frame is an arc of a circle. The bars are of such length that the type on each strikes the platen at the same point. When a key is depressed, the bar strikes the inking ribbon against the paper, making the impression of the character. As the bar drops back to its position, the carriage moves forward one space, thus putting the paper in position for the next letter.

The cylinder machines have the type arranged on a cylinder, and the depression of the key causes the cylinder to revolve to a point which allows the character desired to be pressed upon the paper by a little hammer. The arrangement of keys on all makes of typewriters is practically the same; the so-called universal keyboard is in use with but slight modifications on over ninety per cent of all models.

TYPHOID, *ti foid'*, **FEVER**, a germ disease caused by the presence of a bacillus which lodges in the intestines, spleen and mesenteric lymph nodes. The multiplication of the bacilli causes ulceration of the intestines, and when the ulcers perforate the intestinal membranes the disease is fatal. Typhoid germs enter the system through the mouth, from whence they find their way to the intestinal tract. Food and drink are the most common vehicles which serve as conveyors of the bacillus, and polluted water and milk are the most common sources of infection. Water containing sewage is a particularly dangerous carrier of bacilli.

Symptoms and Treatment. It requires from eight to fourteen days for the disease to develop after the germs have entered the system. The attack usually comes on slowly, and the patient may continue his regular work for a few days, but ultimately he will have to go to bed. The first symptoms are nausea, headache, pains in the back and limbs and sometimes nosebleed and chills. During the first week the fever rises about one degree a day, until the temperature reaches 103° or 104°. The fever remains stationary the second week; during the third week it should begin to subside, and convalescence should begin the fourth week, unless the case is one of unusual severity. Sometimes the ulcers penetrate the blood vessels of the intestines and cause hemorrhages, which may prove fatal. When the fever begins to decline the patient is in grave danger; he suffers from weakness, tremors of the muscles and possibly delirium, and he may die from weakness.

The treatment for typhoid fever is largely hygienic. The fever is kept down by sponging, and by cold packs and baths. Liquid nourishment, consisting of milk and broths, is given at intervals of about three hours to keep up the patient's strength, and medicines to counteract the effects of the germs are administered. Proper nursing is the most important part of the treatment.

Prevention. Excretions from the bowels and the urine of one affected with typhoid fever contain millions of germs, and all bodily discharges should be disinfected by strong solutions of corrosive sublimate, carbolic acid or chloride of lime. The bedding and clothing should be immersed in boiling water. All dishes, thermometers or other appliances used about the patient should be thoroughly dis-

infected every time they are used. Flies, when they have access to infected substances, gather the germs on their feet and carry them to other households. They are one of the prolific causes of the spread of the disease.

Typhoid is not contagious by the breath or by touch; it is conveyed only by carrying the germs. Vaccination with three hypodermic injections of a special vaccine is considered to render one immune for three years; army surgeons attribute the protection of the allied forces during the World War to this method of prevention. There have been widespread educational campaigns to teach people how to prevent typhoid fever, and as a result of this work there has been a marked decline in the number of cases since the beginning of the present century. The following directions issued by the New York City Department of Health should be observed by every family and community:

Keep yourself in good health. Do not use alcoholic drinks. Keep your home and your body clean. Always wash your hands before eating. Drink only the best milk; if in doubt, boil it. Drink only pure water; if in doubt, boil it. Eat only pure, good food. Fresh-cooked food is safest; heat kills the germs. Avoid salads, raw vegetables and raw oysters, unless you know they come from a clean place. Wash ice when it comes and keep the ice-box clean. Do not put ice in drinking water or on food. Deal only with good, clean food stores. Don't eat at dirty restaurants. Keep flies out of your rooms and away from your food. Be careful when you go to the country; be sure of what you eat and do not drink from a strange spring or stream. Never visit where there is a case of typhoid fever. Be careful about friends who have had typhoid fever; they may be carriers. Where there is an outbreak of typhoid fever use only boiled water for drinking, and also boil milk just before it is used. If typhoid fever is in your house or neighborhood, or you are exposed to the disease in any way, or are likely to be, have yourself immunized.

TYPHOON, *ti foon'*, the name applied to the hurricanes that sweep over the coast of China, and Japan and the neighboring archipelagoes from May to November. The storms are most frequent and disastrous in July, August and September. The typhoons are cyclonic storms, which originate somewhat farther south than Manila and move towards Indies. See HURRICANE.

TYPHUS, *ti' fus*, **FEVER**, known, also, from the place where it occurs, as *hospital fever*, *jail fever* and by other names, is essentially a fever of the poor, ill-fed and badly-housed inhabitants of large cities. It is

infectious, and is carried by both body lice and head lice. A period of from five to twelve days passes after infection, before the first symptoms show themselves. Then the disease comes on suddenly, with a chill, followed by a high fever, sharp rheumatic pains and headache. Generally about the seventh day, a rash, of irregular spots of dusky hue, appears over the chest and back, and this has given to the disease the common name of *spotted fever*. Delirium is almost always present during the second week, and after a marked crisis, followed by a sound sleep, the person awakes with the fever gone. Thereafter recovery is rapid. The disease is often fatal, especially where the best of care is not given the patient.

The treatment consists in keeping the sufferer in a well-ventilated room, and in preventing exhaustion by light, wholesome diet. One of the worst epidemics of typhus fever known in recent times occurred in Serbia in 1914-1915. Several cases were carried to New York by passenger steamers, and during the study of these cases Dr. Plotz discovered the germ which causes the disease.

TYRE, *tire*, one of the most celebrated cities of ancient Phoenicia, on the Mediterranean Sea, fifty miles south of Beirut and twenty-four miles southwest of Sidon. From 1200 to 850 B. C., it was a wealthy and magnificent city, the chief commercial center of the world, famous for its dyes and glassware. The original city occupied an island three-fourths of a mile from the mainland. In 332 B. C., when Alexander the Great besieged the city, he built a causeway out to the island, and the sands deposited by the sea upon this structure transformed the island into a peninsula. The modern town, called Sur, has a population of about 6,000.

TYROL, or **TIROL**, *tir'ol*, before the dissolution of the Austro-Hungarian monarchy in 1918, a crownland of Austria, comprising the greater part of the political district of Tyrol and Vorarlberg. It lies in the heart of the Alpine region, and is noted for the charm and variety of its scenery, which is much like that of Switzerland. After the World War, Italy laid claim to this region, because a portion of the inhabitants are Italians, but the League of Nations awarded most of it to the new Republic of Austria. The capital is Innsbruck. The province of Tyrol has an area of 4,790 square miles and a population of about 300,000.



U, the twenty-first letter and the fifth vowel in the English alphabet. It comes from the Greek alphabet, as the Phoenician had no such character, and it was, until comparatively recent times, used interchangeably with *v*. In time, *v* came to be used for the consonant sound and *u* for the vowel sound, as in the case of *j* and *i*. The true primary sound of *u* was that which it still retains in most of the languages in Europe, that of *oo* in *cool*, the sound being sometimes short, sometimes long. The so-called "long *u*" in English, however, has a distinct *y* sound prefixed to the *oo* sound, as in *use*, *abuse*.

U'DALL, NICHOLAS (1506–1556), the author of *Ralph Roister Doister*, the earliest English comedy. He was master of Eton School from 1534 to 1541, and the play was originally written for performance by the scholars. Udall was in favor at court as a writer of pageants and interludes.

UFFIZI, *oof feet'se*, a famous palace in Florence, containing one of the most extensive and valuable art collections in the world. This gallery was founded by the Medici family in the fifteenth century, and valuable additions have been made from time to time. In the collection are the statues *Venus de' Medici*, *The Dancing Faun* and *The Wrestlers*, and the works of great masters, such as Raphael, Michelangelo, Titian, Correggio, Holbein and Rembrandt. The Uffizi also contains the Biblioteca Nazionale, a collection of 300,000 volumes and 14,000 manuscripts. It is connected by covered passageway with the Pitti Palace (which see).

UGANDA, *oo gahn'da*, the administrative division of British East Africa that forms the western part of the colony. It consists of the former native kingdom of Uganda and a number of adjacent states. Its area is 109,119 square miles, practically that of the state of Nevada. Of this area, 16,377 square

miles are water, for within the boundaries lie portions of Victoria Nyanza, Lake Edward, Lake Albert and Lake Rudolph, and all of lakes George, Kioga and Salisbury. The region around Lake Rudolph is low and generally unproductive. The western and southwestern parts of the protectorate consist of rolling country and plateaus, varying in altitude from 2,000 to 4,000 feet, upon which mountain peaks rise to the height of 12,000 to 16,000 feet. Here are some of the most prominent mountains of Africa including the Ruwenzori, whose highest summit, Alexandra, has an altitude of 16,794 feet.

Gold is mined, and there is an abundance of iron throughout the country. Although the natives are quite skilful in working the ore, there is but little mining. With the exception of the Lake Rudolph region, the soil is generally fertile. The climate in the highland region of the southwest is pleasant and inviting, and this part of the protectorate holds great possibilities. Commercially, cotton is the most important crop, and its cultivation is being rapidly extended. Coffee, peanuts and cacao are among the other leading crops. Ivory and hides are exported.

In 1917 there were 2,954,861 inhabitants, and about 2,900,000 of these were natives. The Bantus, who are agriculturists, and the Baganda are the most important tribes. The Baganda, who number about 600,000, are noted for their intelligence. Most of them have embraced Christianity, and they are rapidly adopting the ways of civilization. They build permanent homes, and have done much in constructing roads and in developing the country since it was opened to Europeans. The country has railway, steamboat and telegraph communication.

The protectorate is divided into five provinces for the purpose of local administra-

tion. The native tribes maintain their own form of control in all local measures, and some of these governments are very efficient. Entebbe is the seat of government and British headquarters, and Mengo is the native capital.

Uganda was first visited by Captain Speke in 1862. It was again visited in 1875 by Stanley, who wrote an extended description of the country and its people for his *Through the Dark Continent*.

UHLANS, *oo' lahnz*, bodies of mounted lancers, chiefly employed in reconnoitering, skirmishing and outpost duty. They were of Eastern European origin, and formerly wore a semi-Oriental uniform with flowing sleeves and baggy trousers. Later, Uhlans became a part of several western armies. In the World War (1914-1919) the term was particularly applied to the Prussian light cavalry troops.

UINTA, *u in' tah*, **MOUNTAINS**, a mountain range in Northeastern Utah, a part of the Rocky Mountain system, jutting at right angles from the Wasatch range. Its highest peaks are Gilbert Peak, 13,687 feet above sea level; Emmons Peak, 13,624 feet, and Wilson Peak, 13,300 feet. The Green River gorge cuts across the Uinta range, disclosing the varied strata of the mountains, some of which contain deposits of coal.

UKRAINE, **THE**, called also **UKRAINIA**, a district in the southwestern part of European Russia, proclaimed an independent republic in November, 1917, at the time of the overthrow of the Kerensky régime by the Bolsheviks. The Ukraine is made up of those former Russian provinces inhabited by the Little Russians, or Ruthenians. Its estimated area is 216,400 square miles, and the population is about 30,000,000. Kiev is the capital. The Ukraine occupies a portion of one of the most fertile districts in Europe, and has been called the "granary of Russia."

Its career since the downfall of the czar has been very troubled. The government established in 1917 sent peace delegates to Brest-Litovsk, and a treaty with the Central Powers was signed on February 9, 1918. Germany expected to obtain large supplies of grain from the Ukrainians, but the peasants, who were angered by the methods employed, burned the stores in preference to handing them over to the Germans.

After the armistice was signed it was hoped that order might be restored, but the Ukraine shared all the troubles of the other border

Russian states. Its claims to the province of Galicia were disputed by Poland, and there was conflict with the Rumanians over Bessarabia. In addition, the Bolshevik government of Russia proper sent a "red" army into the region to establish soviet rule. After several months of conflict peace was secured, and the Ukraine became federated with the Soviet Government of Russia. In December, 1922, a Treaty was concluded, placing the Ukraine under control of the Soviet Government at Moscow. See **RUSSIA**; **WORLD WAR**.

ULCER, *ul' ser*, an open sore on the skin or any of the mucous membranes, both external and internal. The tendency of an ulcer is to eat away the underlying tissues. An abscess, on the other hand, usually begins in the tissues and works outward (see **ABSCESS**). Ulcers may be caused by constitutional disorders or through infection. Treatment consists in giving the patient fresh air, proper diet and hygienic surroundings, and providing local treatment for the sore. Such treatment must be prescribed by the attending physician. Ulcers due to tuberculosis can often be healed by exposure to sunlight.

ULTRAMARINE, *ul trah ma reen'*, a beautiful and durable sky-blue pigment, a color formed of the mineral called lapis lazuli. This substance is much valued by painters, on account of the beauty and permanence of its color, both for oil and water painting.

ULYSSES, *u lis'eez*, called by the Greeks **ODYSSEUS**, one of the most famous of their legendary heroes, an important character in the *Iliad*. Rejected by Helen, Ulysses married Penelope and settled down with her to a happy life. Shortly after the birth of his son Telemachus, the Trojan War broke out, and Ulysses, in spite of a vow to help Menelaus, was unwilling to leave home and engage in the struggle. In order to escape, he feigned madness, but Palamedes visited him and, becoming convinced of his sanity, made use of a stratagem. While Ulysses was plowing up the seashore and sowing it with salt, Palamedes placed the boy Telemachus in front of his father's plow, and Ulysses, carefully turning aside his team, unwittingly revealed the fact that his madness was merely feigned.

He was compelled to join the expedition and at Troy proved himself one of the bravest of the Greek heroes. The chief interest in Ulysses, however, attaches to his adventures while he was returning from Troy. Driven

to the country of the Lotus-eaters, he with difficulty broke the spell cast upon his companions and induced them to continue the voyage. Meeting with Polyphemus the Cyclops, he put him to death, thus offending Neptune, who constantly pursued him with his wrath. He was driven upon the island of Circe; he was placed in danger between Scylla and Charybdis, and he was borne, after the death of all of his companions, to the island of the nymph Calypso, where he remained for seven years. Returning at last to Ithaca, he found Penelope in great trouble, but with the aid of Telemachus overcame her annoying suitors and made himself powerful again in his kingdom.

Related Articles. Consult the following titles for additional information:

| | |
|---------|------------|
| Calypso | Penelope |
| Circe | Polyphemus |

UMBELLIFERAE, *um bel if'ur ee*, the parsley family of flowering plants, containing about 2,000 species, among which are the familiar garden varieties, carrot, parsnip, celery, anise, parsley, fennel and caraway. The flowers, usually inconspicuous and individual, are arranged in large umbrellalike groups, called umbels. The leaves contain oil and a resinous matter, sometimes of a poisonous character. The umbelliferae are distributed throughout the world, but are most abundant in the north temperate zone.

UM'BER, a mineral pigment resembling ochre, yielding a brown paint when raw and a reddish paint when burnt. It is found in many localities in Europe, notably the island of Cyprus, and takes its name from Umbria, Italy, where it was first discovered. There are veins of umber in Illinois, Pennsylvania and several other states.

UMBREL'LA BIRD, a black South American bird, related to the crows and remarkable for its handsome drooping crest of blue-black feathers. It lives in the deep woods, depositing its eggs on a platform of sticks in the top of a high tree. Its cries are described as "lowings."

UNALASKA, *oo nah lahs'kah*, one of the largest of the Aleutian Islands, about seventy-five miles long and twenty miles wide at its widest point. The chief settlement is Unalaska, or Iluliuk, on the north side of the island. Population, 420. See ALEUTIAN ISLANDS.

UNCAS, *un'kahz* (?—about 1683), an American Indian chief, born in the Pequot settlement in Connecticut. In 1635 he re-

belled against the head chief of the Pequots and founded a tribe of his own known as the Mohegan. In 1637 he combined with the colonists for the destruction of the Pequots and was given a portion of the conquered territory. His friendly intercourse with the colonists aroused the jealousy of the Narragansetts, who made war upon the Mohegans, and for the next few years Uncas was almost continually defending his territory from invasion. A monument has been erected in Norwich, Conn., in his honor.

UNC'TION, or **EXTREME UNCTION**, a sacrament of the Roman Catholic Church, administered to the dying to give them strength and grace physically and spiritually in the hour of death. In this sacrament, the priest, dipping his thumb in the oil, anoints the sick person in the form of the cross upon the eyes, ears, mouth, nose, hands and feet, saying, "Through this Holy Unction and His most tender mercy, may the Lord pardon thee whatever sins thou hast committed by seeing. Amen." He repeats the same, adapting it to the part anointed. The oil used in this sacrament must be blessed by the bishop, a ceremony performed each year on Maundy Thursday.

UN'DERGROUND RAIL'ROAD, the name applied to a method used by Northern abolitionists before the Civil War in assisting slaves from the South to escape from their masters. Regular routes were laid out, and certain houses at convenient intervals were designated as stations. Fleeing negroes were conducted secretly from one of these points to the next, given rest and food and prepared for the next stage in their journey. The most common routes were through Ohio and Pennsylvania, the goal of each being Canada. Among the prominent promoters of the underground railroad were Gerrit Smith, Theodore Parker and Levi Coffin. It is believed that fully 25,000 negroes were thus given liberty during the quarter century preceding the Civil War, fines inflicted on detection for violation of the Fugitive Slave Law having little effect on the abolitionists. An interesting account of the system occurs in Mrs. Stowe's *Uncle Tom's Cabin*.

UNDERGROUND RAILWAY. See SUBWAY.

UNDERWOOD, OSCAR W. (1862-), an American statesman, one of the prominent Democrats in Congress of the present

decade. He was born in Louisville, Ky., and was educated in that city and at the University of Virginia. After completing a law course, he was admitted to the bar in 1884 and began practice in Birmingham, Ala. Entering politics, he was elected to Congress and took his seat in the lower house in 1895 as Representative of the Ninth Alabama district. This office he held until 1915. In the special session of Congress called by President Wilson in 1913 to revise the tariff, Underwood, who was chairman of the Ways and Means Committee and majority leader in the House, took a prominent part in framing the tariff law that bears his name (see **TAR-IFF**). He was elected to the Senate in 1914 and re-elected in 1920.

UNEMPLOYMENT. In all countries, at all times, a certain proportion of laborers—skilled and unskilled—are out of work. The term *unemployment* is applied in economics to this industrial condition. The unemployed may be divided into two general classes—those who are out of work because of conditions beyond their control, and those indolent men who will not work as long as they can obtain a living by their wits. This article considers only the first class.

Causes of Unemployment. The following are some of the chief causes of unemployment:

1. **Change of Season.** Some occupations depend upon the season, such are those of bricklayers, stonemasons, and others included in the building trades. In cold countries these occupations must cease during the winter.

2. **Fluctuation of Demand.** A number of industries have their dull seasons and their busy seasons. Clothing and millinery are good illustrations of industries of this class.

3. **New Inventions and Discoveries.** The introduction of new machinery and of new processes of manufacture always throw a number of workmen out of employment, temporarily, but men thrown out in this way are usually given employment in some other occupation, if they are willing to make the change.

4. **Change of Location.** Occasionally an industry is removed to a distant locality, and some of the workmen are unable or unwilling to remove to the new location and are left without employment. This condition is frequently brought about by combining firms into a trust. For economic reasons the trust usually closes some of the plants.

5. **Congestion of Labor.** Every year thousands of men and women flock to the great cities for the purpose, as they suppose, of bettering their condition. To these other thousands are added by immigration. Usually

there are more laborers in large cities than the regular industries can profitably employ.

6. **Industrial Depression.** During periods of prosperity there is a tendency to produce commodities in excess of the demand for them. In course of time the market becomes overstocked, manufacturers have their capital invested in products that they cannot sell, and production is greatly restricted or entirely suspended. When this occurs, large numbers of workmen are without jobs.

7. **Labor Troubles.** Disagreements between employers and employes over wages and other conditions all too frequently lead to strikes and lockouts, causing large numbers to be thrown out of employment for indefinite periods. In these contests both parties generally lose. See **Labor Organizations; Strike.**

Means of Prevention. From the nature of the problem statistics of unemployment are incomplete, and consequently are of little value. Much time and effort have been expended in trying to solve the problem, yet it is found that the unemployed in the United States include from 12.5 to 27 per cent of the laboring population. This means that at all times there are several million idle workmen. The following measures have been taken or suggested to remedy this condition:

1. **Labor Bureaus.** The establishing of labor bureaus, which register applications for positions and calls for workmen, has been found an excellent means of bringing the workman and the employer together. The United States Department of Labor through branch bureaus located in different parts of the country is serving as a general clearing house for the unemployed, and its services are very beneficial. A number of states also have established free employment bureaus. In addition to these there are many private bureaus that operate on a commission basis.

2. **Publishing Labor Conditions.** It is the opinion of those who have devoted much study to this problem that regular publication by responsible authorities, state or national, of the condition of the labor market in great cities might check the influx of laborers to these centers.

3. **Shorter Days.** Some recommend the adopting of a shorter day, so it would require more workmen to keep production up to the standard. However, the results of this experiment everywhere it has been tried have not shown the measure to be effective.

4. **Restriction of Immigration.** A large proportion of immigrants remain in the ports where they land, the balance go to other cities or to mining regions, where there is usually a congestion of labor.

5. **Agricultural Colonies.** With rare exceptions there is a scarcity of labor in the country. Could many of these workmen who are out of employment be induced to remove

to farms, they might become prosperous, but special inducements are necessary to lead them to make this change. States having large areas of vacant land, philanthropic organizations and the United States government are interested in establishing farm colonies.

UNGAVA, *ung gah' va*, formerly a territory of Canada, but united to Quebec in 1912, the year in which so many provincial boundaries in the Dominion were changed. In the same year the province of Quebec formed a new territory under its jurisdiction, called the Territory of New Quebec. It includes Ungava and Labrador, and has an area of 351,780 square miles. The population is about 14,300; of these 8,800 are white people, 3,500 are Indians and 2,000 are Eskimos. See LABRADOR.

UNGULA' TES, an order of mammals including the buffalo, camel, cow, deer, elephant, pig, goat, sheep, and related animals, generally characterized by strong molar teeth for the chewing of vegetable food; horny hoofs, which enclose their toes; and, in many cases, by the ability to run with speed. Ungulates are the only animals that have horns. They are important in human economy, furnishing man with food, clothing, working power and means of transportation.

Related Articles. Consult the following titles for additional information:

| | | |
|----------|--------------|------------|
| Antelope | Elephant | Ibex |
| Boar | Giraffe | Peccary |
| Camel | Goat | Rhinoceros |
| Cattle | Hippopotamus | Sheep |
| Deer | Horse | Tapir |

U'NICORN, a fabulous animal of Greek and Roman mythology, similar to a horse but having a horn on its forehead. With the lion it forms a part of the British coat of arms.

UNIFORMS, MILITARY AND NAVAL. A uniform is a distinguishing dress worn by members of armies, navies and other organizations. This article treats of military and naval uniforms only. Since the beginning of the present century, the military uniforms of the leading nations have been radically changed. The display dress of former times has been replaced by one designed especially for comfort and service. The change was inaugurated by Great Britain, because at the beginning of the South African War the uniforms of the British soldiers were too heavy for service in a hot country.

The old uniforms were replaced by those of khaki. The color adopted was the same as that of the khaki-colored uniforms used in

India. The cut was loose; the coat had patch pockets and the trousers were tight at the knee. The lower leg was protected by boots, leather leggings, or strips of strong woolen material called *puttees*, which were wound around the leg. This type of uniform proved to be so comfortable and serviceable that it has been practically copied by all the leading nations, each making such modifications in color and minor particulars as would distinguish its uniform from that of other nations. The service uniform of the German army was a greenish-gray, and that of Italy is a brownish-gray. The French, however, still retain the blue and red color scheme of former days.

United States. The service dress of the United States army is of khaki; the cut is similar to that of the British uniform described above. A cap of the same material and color is worn, but when the soldier is in battle this cap is replaced by a metal helmet.

Branch and Line Badges. Each branch is distinguished by a badge. Members of the general staff wear the United States coat of arms of gold and enamel on a silver star. A shield marks the department of the adjutant-general, and the inspector-general is designated by a crossed sword and fasces with a wreath. A sword and key crossed on a wheel and surmounted by a spread eagle is the badge of the quartermaster-general. Members of the medical staff wear the caduceus, or wand of mercury; engineers are indicated by a metal castle, and members of the signal corps by two crossed signal flags and a torch in gold and silver. The badges for officers are as follows: infantry, two crossed rifles with the number of the regiment above the intersection; for cavalry, two crossed sabers, and for artillery, two crossed guns.

Distinctions in Rank. A brigadier-general is designated by one star on the shoulder straps, and a major-general by two stars. On shoulder knot and shoulder loop the general wears a coat of arms between two stars; lieutenant-general, one large star between two small ones; major-general, two silver stars; brigadier-general, one silver star; colonel, a silver eagle; lieutenant-colonel, a silver leaf; major, a gold leaf; captain, two silver bars; first lieutenant, one silver bar; second lieutenant, one gold bar. The rank of noncommissioned officers is indicated by

chevrons on the coat. All officers, without distinction of rank, wear the letters *U. S.* in Gothic design on the collar.

Gold chevrons on the lower part of the sleeve of soldiers returning from the World War indicated the length of service abroad, there being one chevron for every six months of service.

The Navy. The uniforms worn in the United States navy may be considered typical of those in other navies, since naval uniforms are similar throughout the world. Three uniforms—dress, undress and service—are furnished to every member of the navy. The dress uniform consists of a double-breasted blue broadcloth coat with a high collar and gilt buttons; blue trousers with a strip of gold lace along the seam; epaulets, hat and sword. The service uniform includes a blue or white blouse, with white braid. This or the undress uniform is worn during hot weather and in the tropics.

Officers and cadets wear on the cap a silver shield surmounted by a spread eagle, the design being mounted on two gold anchors crossed. Rank is indicated by special emblems on collar, epaulet and shoulder strap. An admiral wears on the sleeve two strips of two-inch gold lace with a one-inch strip between; a rear-admiral wears a half-inch strip of gold lace above a two-inch strip; captain, four half-inch strips; commander, three strips; lieutenant-commander, two half-inch strips with a quarter-inch strip between; lieutenant, two half-inch strips; lieutenant (junior grade) one half-inch strip with one quarter-inch strip above; ensign, one half-inch strip; cadet, one quarter-inch strip.

UNION, ACT OF, an act of the British Parliament in 1841 for uniting Upper and Lower Canada. It was the result of the Earl of Durham's famous *Report on the Affairs of British North America*, and was favored at the time by the legislatures of both Upper and Lower Canada. Under the Act of Union, Canada was governed by a legislative council of not more than twenty members, appointed by the Crown, and a legislative assembly in which the provinces had equal representation. It was never entirely satisfactory in its operation, however, and was succeeded, in 1867, by the organization of the Dominion of Canada.

UNION OF SOUTH AFRICA, a self-governing state of the British Empire,

widely known for its mineral wealth and consisting of the provinces of the Cape of Good Hope, Natal, Orange Free State and the Transvaal. It was established by an act of Parliament in 1909. It has an area of 473,075 squares miles, and a population of about 7,000,000, one-fifth of whom are whites, chiefly of Dutch and English descent.

Agriculture. The country consists of plateaus and rolling plains, or *veldts*, which are almost treeless and afford excellent pasturage. The climate is temperate, and the soil is fertile. Wherever there is sufficient rainfall excellent crops can be grown, but stock raising is the chief agricultural occupation. Millions of sheep are pastured on the prairies, and wool is the staple of wealth among the farmers. Angora goats and cattle are also raised in large numbers, and ostrich farming has become an important industry. Sugar cane and tea are successfully cultivated in the warmest regions. Wheat and fruits are important products of the Cape Province. It is claimed that the Union of South Africa has such a variety of climate as to admit of the successful cultivation of all crops within its borders.

Mineral Resources. The mines constitute the greatest source of wealth, and the discovery of the vast deposits of gold and rich diamond fields brought the country into universal notice. The principal gold mines are in the Witwatersrand in the Transvaal, and in 1918 the output of these mines exceeded \$188,615,000 in value. The most valuable diamond mines are around Kimberley, and the yearly output of diamonds amounts to about \$50,000,000. There are valuable copper mines in Namaqualand, and extensive deposits of coal and iron have been discovered in the Cape Province and Natal. Silver, graphite and manganese occur in paying quantities, and marble and other building stone are found.

Transportation and Communication. The roads are fair in the settled districts, and mail carts and other wagons connect large towns off the railways with these lines of transportation. All the important ports of the south and east coast are connected by railway, and these lines are joined to the Cape-to-Cairo Railway, extending from Cape Town into the interior of the continent. At the end of 1921 there were 9,559 miles of railways in the South African railway system. There were about 13,000 miles of telegraph line, and

the telephone lines carried over 140,000 miles of wire. The country has over 2,700 post-offices and an efficient mail service.

Government. The government is organized on the same plan as the governments of Canada and Australia. The chief executive is the Governor-General, who is appointed by the Crown. He is aided by an Executive Council of his own selection. The Parliament consists of a Senate of forty members (eight appointive and thirty-two elective) and a House of Assembly of 134 members elected by the people. Each province has its local government, consisting of a lieutenant-governor and a legislative assembly. The courts are guided by Dutch law in settling civil suits, and both Dutch and English languages are used. Both of these languages are taught in the schools.

History. The early history of the provinces is given under their respective titles. Before the South African War there was a constant struggle between the Dutch and English settlers. The war gave the English the ascendancy, and the ablest of the Dutch leaders soon joined the English leaders in an effort to establish a permanent government that would be satisfactory to all parties; their efforts resulted in establishing a federated state including the five provinces. Several clashes with the natives have occurred, and soon after the outbreak of the World War the country was threatened with a serious rebellion, but the rebels were defeated and order was restored.

Related Articles. Consult the following titles for additional information:

| | |
|--------------------|-------------------|
| Cape of Good Hope, | Natal |
| Province of the | Orange Free State |
| Cape Town | Pretoria |
| Johannesburg | South African War |
| Kimberley | Transvaal, The |

UNIONTOWN, PA., the county seat of Fayette County, seventy miles southeast of Pittsburgh, on the Baltimore & Ohio and the Pennsylvania railroads. It is the center of a region rich in coal, iron ore, glass sand and natural gas, and its industrial plants include lumber mills, coke ovens, steel works, foundries, machine shops and glass and other factories. The principal buildings are a hospital, a courthouse and a county home for the poor. Uniontown was settled in 1767, and the borough was incorporated in 1796. Population, 1910, 13,344; in 1920, 15,609, a gain of 17 per cent.

UNIT, a single thing regarded as an undivided whole. In arithmetic the term is

also used to denote the least whole number, *one* or *unity*, represented by the figure 1. In mathematics and physics, a unit is any known determinate quantity, by which any other quantity of the same kind is measured, as a foot, a second, a degree, a square yard (see **WEIGHTS AND MEASURES**). Below are given the more important special units used in physics.

The *unit of specific gravity*, for solids or liquids, is the specific gravity of one cubic foot of distilled water at 62° F.; for air and gases, of one cubic foot of atmospheric air at 62° F. The *unit of heat*, or the *thermal unit*, is the quantity of heat required to raise one pound of pure water from a temperature of 39° F. to a temperature of 40° F., or, in the metric system, the amount of heat required to raise a gram of pure water from a temperature of 3.94° C. to 4.94° C.

In electricity the *unit of quantity* is that quantity of electricity, which, with an electromotive force of one volt, will flow through a resistance of 1,000,000 ohms in one second; it is called a *farad*. The *unit of electric current* is a current of one farad a second. The *unit of physical work* is that amount of work which will produce a velocity of one meter per second in a mass weighing one gram, after acting upon it a second of time. The *dynamic unit* is the unit expressing the quantity of force or the amount of work done, as the *footpound*.

In physical calculations the system of units now in general use is that known as the *C. G. S. System*, based upon the metric system of weights and measures, in which the centimeter is the *unit of length*, the gram is the *unit of mass* and the second the *unit of time*. Consequently, the *unit of area* is the square centimeter; the *unit of volume*, the cubic centimeter; the *unit of velocity*, a velocity of one centimeter per second. The *unit of momentum* is the momentum of a gram moving with a unit velocity.

For definitions of units of measurement in other fields of work, see articles on those units, as **FOOT**; **POUND**; **DOLLAR**.

UNITARIANS, a religious denomination believing in one God, the Father, and not in a Trinity of Father, Son and Holy Spirit. They accept Christ as a divinely appointed teacher, to be followed, but not worshiped, and regard the Bible as an endeavor of the religion of the spirit to express itself in literature. The Unitarians have no creed; their





Hammond's 8 x 11 Map of the United States
Copyright by C.S. Hammond & Co., New York

faith may be summed up in the words of James Freeman Clarke, "the fatherhood of God, the brotherhood of man, the leadership of Jesus, salvation by character and the progress of mankind upward and onward forever." In 1819, Dr. Channing of Boston led a movement which turned 150 of the New England churches to Unitarianism. See CHANNING, WILLIAM ELLERY.

UNITED DAUGHTERS OF THE CONFEDERACY. See CONFEDERACY, UNITED DAUGHTERS OF THE.

UNITED EMPIRE LOYALISTS, the name given to those British colonists in America, who remained loyal to the King, and refused to join the majority, who in 1776 declared their independence of Great Britain. About 40,000 of these colonists left New England and other colonies to the south and crossed the border into Canada, and made new homes there. Many moved to Nova Scotia and Quebec, but most of them settled in New Brunswick and Southern Ontario and were an important element in the creation of these provinces. It was said that this great migration "was the saving of British interest in the great region which England still retained in North America."

UNITED KINGDOM, THE, officially THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND, a term formally adopted in 1801 to indicate the political union of England, Ireland, Scotland and Wales. See GREAT BRITAIN.

UNITED PROVINCES OF AGRA AND OUDH, *oud*, a province of British India, formerly known as NORTHWESTERN PROVINCES AND OUDH, occupying the Upper Ganges valley. It has an area of 107,267 square miles, of which 83,109 belong to Oudh and 24,158 to Agra. The northern part is in the mountainous region of the Himalaya, but the rest of the province is a low, fertile plain watered by the Ganges, the Jumna and a number of other streams. In the southern part the rainfall is uncertain, and irrigation is necessary. About one-fifth of the cultivated land in the province is under irrigation. The province includes one of the most productive agricultural regions of India; the chief crops are wheat, rice, barley, millet and sugar cane.

About one-sixth of the inhabitants are Mohammedans, and about 250,000 Christians; the remainder are Buddhists. Total population in 1921, 45,590,946.

UNITED STATES COAST GUARD. See COAST GUARD.

UNITED STATES COURTS. See COURTS, subhead *United States Courts*.

UNITED STATES INDIAN TRAINING AND INDUSTRIAL SCHOOL, at one time the largest and most successful school for American Indians, was founded at Carlisle, Pa., in 1879. Its central purpose was to provide a school where such mental, moral and manual training could be secured by Indian boys and girls that they would be led to appreciate the value of modern civilization and desire to attain to it. Besides the training in the common manual trades and elementary instruction in the common branches of study, an "outing" system was provided. Under this plan, as many as possible of the students were sent out into the homes of white people as servants, to study and live the life of the Caucasian. After a remarkably successful career of forty years, during which it educated thousands of Indian youth, many of whom returned to their people and became teachers, the school was abandoned in 1918, because the opening of numerous similar schools near Indian reservations made its continuance unnecessary.



UNITED STATES OF AMERICA, one of the world's great powers, the oldest of the great republics, although one of the youngest nations. It occupies the central part of North America, having Canada for its northern neighbor and Mexico on its southwestern border. The tides of the Atlantic wash its eastern shores, the Gulf of Mexico its southern, while the western look out upon the broad Pacific, aptly styled the "American Ocean." The greatest extent from east to west is 3,100 miles, and from north to south 1,700 miles. The area of continental United States is 3,026,789 square miles, of which 43,000 square miles are water. But to this area the outlying possessions add about 716,700 square miles, making the total area of the territory under control of the United States government 3,743,478 square miles. The British Empire and China are larger than the United States, including its outlying possessions, and

Brazil is larger than continental United States. The British Empire and China have each about four times the population of the United States, but Brazil has only about one-fourth as many inhabitants.

Geographic Advantages. Human development has always been influenced by geographic conditions, chief among which are climate, soil and relative location. When these conditions are applied to the United States, it is seen that it is more highly favored geographically than most other nations. The country lies wholly within the north temperate zone, which has been the home of the great civilizations of history; it lies between two great oceans, almost equally distant from the other great land masses of the earth, with which it has easy communication; mountain and valley, hill and plain are so interspersed as to adapt the country as a whole to all lines of industry; while the great interior, with its broad plains, fertile soil and abundant rainfall is the richest agricultural region of the world. Great rivers furnish natural waterways leading far into the interior and affording inexpensive transportation, while thousands of mountain streams turn the wheels of industry. The ease with which railways can be constructed has caused all parts of the country to be bound together with bands of steel, and commodious harbors on the seaboards accommodate ships laden with the products of all climes. These conditions, combined with the energy, intelligence and genius of the American people, have placed the United States in the foremost position among the great nations of the world.

Boundaries and Coastal Features. West of the 95th meridian the northern boundary is formed by the 49th parallel of north latitude until the Pacific coast is reached; then it extends southward to the Strait of Juan de Fuca, thus placing Vancouver Island within the Dominion of Canada. East of the 95th meridian the northern boundary is very irregular. That portion of it between the meridian and Lake Superior is formed by the Rainy and Pigeon rivers. Through the Great Lakes the boundary line follows the deepest channel, which divides Lakes Huron, Erie and Ontario nearly equally between the two nations, but gives the larger part of Lake Superior to the United States. Following Lake Ontario the boundary is formed for a short distance by the St. Lawrence River, then across New York and Vermont by the 45th parallel;

thence it follows the Height of Land in an irregular course to the northeast, until the northerly point of Maine is reached. From there the boundary is completed by the Saint Johns River, a short, arbitrary line and the Saint Croix River. A portion of the southern boundary is formed by the Rio Grande.

The northern boundary affords the finest example in the world of international faith. By mutual agreement between the United States and Great Britain there has never been a fortification erected along its entire length nor has either nation ever placed a warship or even a gunboat on the Great Lakes. The integrity of the boundary has never been violated.

The prominent projections are, on the Atlantic coast, Cape Cod, Cape Hatteras and the peninsula of Florida; on the Gulf coast, Cape San Blas and the delta of the Mississippi, and on the Pacific coast, Cape Mendocino. The important coast waters are, on the Atlantic, Massachusetts Bay, Long Island Sound, Delaware Bay, Chesapeake Bay, Albemarle Sound and Pamlico Sound; on the Gulf, Apalachee Bay and Mobile Bay, and on the Pacific, San Francisco Bay and Puget Sound. The coast line of the entire country, exclusive of the Great Lakes, is 12,101 miles. The Atlantic coast is 6,017 miles; the Gulf, 3,551, and the Pacific, 2,533.

The chief islands on the Atlantic coast are Nantucket, Martha's Vineyard, Long, Manhattan, Staten, Roanoke and Florida Keys; in the Gulf of Mexico, Tortugas, Saint George's, Santa Rosa, the Chandeleur group, Galveston and Padre; on the Pacific, Santa Catalina, the Santa Barbara group and San Juan.

Surface and Drainage

The vast extent of territory embraced within the United States contains a great variety of surface, but this is naturally divided into five regions—the Atlantic Slope, the Appalachian Highlands, the Central Plain, the Rocky Mountain Highlands and the Pacific Slope.

The Atlantic Slope. This region embraces a narrow strip of land extending from the northeastern corner of Maine to Florida. In the northern part it is extremely narrow, and the slope is steep. The irregularity of the coast line produces numerous good harbors, upon which some of the largest cities of the country are located. Chief among these indentations are Boston Bay, New York

RELIEF MAP OF THE UNITED STATES



Bay, Delaware Bay and Chesapeake Bay. South of Long Island the coast region consists of a tract of level land, varying from 75 to 300 miles in width, known as the Atlantic coastal plain. Along the shore and for a short distance inland the surface is low, level and, in many places, marshy. The land then rises gradually until it meets the Piedmont region, or foothills of the Appalachians, which consist of the remains of an old, worn-down mountain system, formed previous to the present Appalachian system. Where the plain joins the Piedmont region, there is a marked elevation, known as the Fall Line because the rivers reaching the Atlantic fall over this uplift, producing numerous rapids and affording excellent water power.

Appalachian Highlands. This region constitutes the eastern continental barrier and extends from the Gulf of Saint Lawrence to within about 300 miles of the Gulf of Mexico. The trend of the mountains is from the northeast to the southwest. The region consists of a low plateau, from 1,500 to 3,000 feet in altitude, upon which are a number of parallel ranges of mountains. The northern part of the plateau is quite broken, and the mountains are disconnected, forming separate ranges or groups, as the Green Mountains, the White Mountains and the Adirondacks. South of this division, however, the plateau is continuous and is surmounted by a number of parallel ranges of low mountains, such as the Blue Ridge, the Alleghanies and others. The highest peaks in these highlands are Mount Washington (6,293 feet), in the White Mountains, and Mount Mitchell (6,711 feet), near the southern extremity of the plateau. On their western slope these highlands descend by a series of foothills to the prairie region in the central plain.

Central Plain. This occupies the vast interior of the country, and embraces that portion of the great central plain of North America included within the boundaries of the United States. It is naturally divided into three regions, the great plain, the lake region and the gulf region.

The Great Plain. East of the Mississippi, this plain occupies that portion of the interior between the Ohio River and the lake region. Here it descends from the western foothills of the Appalachians to the broad, level prairies which compose most of the

states bordering on the Mississippi. This stretch of level or slightly rolling land continues westward, until it rises in gradual swells to meet the foothills of the Rocky Mountain highlands, where it attains an elevation of from 3,000 to 6,000 feet. With the exception of the Black Hills in South Dakota and Wyoming, the Ozark Plateau, which extends eastward from the southern boundary of Kansas, crossing Arkansas, the southern part of Missouri and the southern part of Illinois, this level tract of land extends southward into Texas and westward until it joins the Staked Plains in the northwestern part of that state. With the exception of the forests in Northern Minnesota and in the Ozark Region, this entire portion of the country is nearly treeless. Timber is found only along streams and in regions where trees have been planted by settlers. These vast tracts of level, treeless land are generally known as *prairies*. Their deep, rich soil, abundant rainfall and salubrious climate make the prairies the most valuable agricultural region in the world.

Lake Region. The Lake region constitutes that portion of the United States which drains into the Great Lakes, and thence through the Saint Lawrence River into the Atlantic. The Height of Land, forming the southern boundary of this region, is nearly parallel with the southern shores of Lakes Ontario and Erie. It extends across the northern part of Ohio, Indiana and Illinois, thence turns northward, to include the eastern portion of Wisconsin, all of Michigan and the northwestern part of Minnesota. The region within the United States is not large. It is either level or rolling, nowhere having high altitudes and much of it was formerly heavily timbered, but the lumbering interests have greatly reduced the forest area. The most distinctive feature of this region is the presence of the great inland seas, which lie wholly or partially within its boundaries.

Gulf Region. The Gulf region includes the lowlands bordering on the Gulf of Mexico and extending inland until they meet the foothills of the Appalachian Highlands. In the valley of the Mississippi, this plain extends northward to the Ohio River, and west of the Mississippi it extends northward to the Ozark Mountains. Along the coast the land is low, level and swampy, but with the exception of that immediately in the vicinity of the Mississippi River, it rises gradually to-

ward the interior, until it reaches a height of 300 to 500 feet. The plain includes all of the southern and southeastern parts of Texas, and in that state it is from 150 to 200 miles in width.

Rocky Mountain Highlands. This region occupies nearly one-third of the area of the country, and consists of a great plateau, upon which rise several ranges of mountains. This plateau reaches its greatest height and width in Colorado and Wyoming. Here it is nearly 1,000 miles wide and from 7,000 to 8,000 feet in altitude. On its eastern slope it rises from the plain in a series of elevations, until the Rocky Mountains, which form its eastern boundary, are reached. These extend entirely across the country and contain numerous peaks, with altitudes of 14,000 feet or more. The western border of the plateau is formed by the Cascade Mountains, in the north, and their southern continuation, the Sierra Nevadas. These mountains contain some peaks higher than those found in the Rocky Mountains. Their eastern slope, since they rise from the plateau, is less abrupt than the western, which descends to the valley between them and the low ranges.

Between these mountain barriers, the surface of the great plateau is widely diversified by lesser ranges, extending in various directions. These ranges divide this vast inland region into three well-marked divisions, the Columbia Plateau, in the north; the Great Basin, and the Colorado Plateau. The first occupies the mountain regions of Washington, Oregon and Idaho. The Great Basin includes nearly all Nevada and Utah and a small portion of Oregon and California; it is entirely surrounded by mountains, and its rivers find no outlet, hence it contains a number of salt lakes and marshes, the most noted among which is Great Salt Lake. South of this, and occupying a small part of Nevada, nearly all of Colorado, a part of Utah, most of Arizona and New Mexico and the southern part of California, is the Colorado Plateau, marked by many high peaks and the deep gorges of its streams. Within the Rocky Mountain Highlands are located several of the great national parks.

The Pacific Slope. Between the Sierra Nevada and Cascade mountains and the coast are low parallel ranges, known as the Coast Ranges. West of these is the narrow strip of land bordering upon the ocean. This low land is much narrower than that bordering

upon the Atlantic, but between the mountains are several valleys noted for their fertility. Chief among these are the valleys of the San Joaquin and Sacramento rivers, the region around San Francisco Bay and that around Puget Sound. Farther inland, in the southeastern part of California, is Death Valley, a remarkable depression, 300 feet below sea level.

Rivers. The United States is drained by five river systems—the Lake system, the Atlantic system, the Gulf system, the Pacific system and the Great Basin system. The portion of the country drained by the Lake system is comparatively small, and the streams flowing into it are generally short and of little importance, though the Saint Lawrence River, forming the outlet of this drainage area, is one of the most important streams in North America.

Owing to the position of the Appalachian Highlands, the rivers of the Atlantic system are short and many of them are rapid. However, the largest of these streams enter the ocean by broad estuaries, which afford excellent harbors, and some of them, particularly the Hudson, the Delaware and the Potomac, cut their way through the mountains, forming deep gorges remarkable for their beautiful scenery. The most important of these rivers, in order, beginning at the north, are the Penobscot, the Kennebec, the Merrimac, the Connecticut, the Hudson, the Delaware, the Potomac, the James, the Pedee, the Santee, the Savannah and the Altamaha. Most of these streams afford excellent water power and the banks of the Merrimac and many others are lined with factories.

The rivers of the Gulf system include the Appalachicola, the Alabama, the Pearl, the Sabine, the Trinity, the Brazos, the Colorado of Texas, the Nueces, the Rio Grande and the Mississippi, which drains by far the largest part of the country.

The rivers of the Pacific system are few, and with the exception of the Columbia, draining the northwestern part of the country, and the Colorado, flowing into the Gulf of California, they are all short and small. Proceeding southward from the Columbia, those worthy of mention are the Klamath, the Sacramento, the San Joaquin and the Salinas. The Colorado, formed by the junction of the Green and the Grand in Utah, drains a portion of the plateau between the Rocky and the Sierra Nevada mountains.

This stream is remarkable for the gorges which it has formed in the middle and lower parts of its course.

The Great Basin system consists of a number of small streams which flow into Great Salt Lake and a few smaller lakes, or those which lose themselves in salt marshes in the desert. The Humboldt is the only important river that loses itself in the sands.

Lakes. Fully one-half of the area of lakes Superior, Huron, Erie and Ontario belongs to the United States, and all of Lake Michigan is within her boundaries. In addition to these great bodies of water, the northern part of the Appalachian Highlands contains many lakes noted for their clear waters and beautiful scenery. Chief among these is Moosehead, in Maine; Winnepesaukee, in New Hampshire, and Champlain, between Vermont and New York. The northern parts of Michigan, Wisconsin and Minnesota are also studded with lakes, and in the Rocky Mountain region are found numerous lakes, some of which, like Lake Tahoe, are noted for their high altitude, others for their great depth, abundance of fish and beautiful surroundings. The Great Basin has Great Salt Lake and numerous other smaller bodies of salt water.

Scenery. For variety, beauty and grandeur, the scenery of the United States is unequalled by that of any other country. The Appalachian Highlands are noted for their mountain lakes, sparkling streams and deep gorges, through which rivers find their way to the sea. Notable among the last are the Crawford Notch, in the White Mountains; the Palisades of the Hudson, and the Delaware Water Gap. The central plain presents to view vast areas of fertile fields. The expanse of fresh water afforded by the Great Lakes is nowhere equaled and is approached only by the great lakes in the equatorial regions of Africa. The only cataract comparable with Niagara is Victoria Falls, on the Zambezi, while the Shoshone Falls, Yosemite Falls, the Falls of the Yellowstone and many others in the Rocky Mountain region are unsurpassed in beauty. The extent and grandeur of mountain scenery found in the Rocky Mountains exceed that of any other single country; the Royal Gorge, Yosemite Valley and the canyons of the Colorado and Yellowstone are features of unusual interest, and the geysers and hot springs of Yellowstone National Park have

caused that region to be termed the "World's Wonderland."

Climate

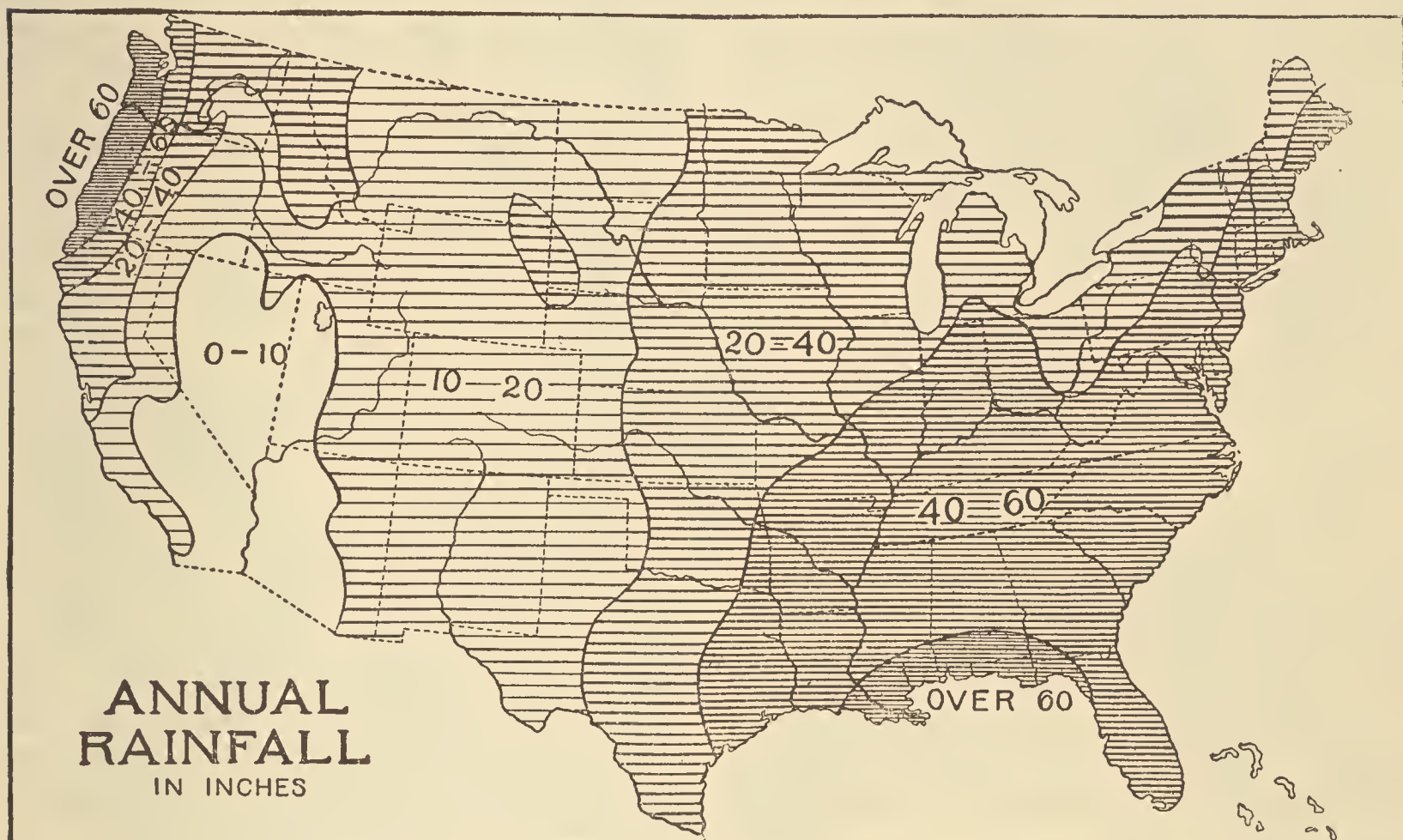
Within the boundaries of the United States may be found every range of temperate climate, and the extreme southern and southwestern sections are semitropical. This great diversity of climate is due to the wide range of latitude (24°), the position and extent of the mountain systems and differences in altitude.

Temperature. On the northern boundary, the average temperature for January is 20° , and for July, 60° . The contrast between the winter temperature on the Pacific and Atlantic coasts in the northern part of the country is very marked, the mean temperature on the Pacific coast being 41° , and on the Atlantic coast, 14° . Toward the south the average temperature rises, and it also becomes more nearly equal at the eastern and western extremities; at the 30th parallel of latitude the difference between the average temperature of the two regions for January is only 2° , and for July, only 9° , while at the extreme southern boundary the January difference is 3° , and the July difference, but 1° . The central plain is open to the passage of air currents with little or no obstruction; consequently alternating north and south winds sweep over this region, causing sudden and marked changes in temperature. The northern part of the Appalachian Highlands has a cool temperate climate. The winters are usually long and severe, and in New England, New York, some parts of Pennsylvania and northern Ohio, there is a heavy fall of snow. Toward the south the mean temperature rises, and south of Pennsylvania little snow falls, except on the highest mountains. Near the Gulf the temperature seldom falls below freezing point, and the Gulf states, with South Carolina and Georgia, verge upon a subtropical climate. The Rocky Mountain region is cooler than other regions in the same latitude, because of its high altitude. The northern part of this region, as well as the northern portion of the central plain, is subject to intensely cold waves during winter, the thermometer occasionally falling as low as 40° below zero; yet, owing to the dryness of the atmosphere, these extremes produce little discomfort. The Pacific coast has a mild climate throughout the year, with a remarkably equable temperature. At sea level the thermometer

seldom falls below freezing point, even in the northwestern part of the country, and during summer it seldom rises above 80° or 85°. In the southern part of California, the temperature in summer may be higher than this, though hot waves, even there, last but a short time.

Rainfall. The position of the mountains causes a very unequal distribution of rain. In general, all that portion of the country

western part of Utah, the western part of Arizona and the southeastern part of California, is practically rainless. This is because the winds are robbed of their moisture as they pass inland from the Sierras. The moisture brought by the winds from the Pacific is precipitated on the western slopes of these mountains. The valleys between them and the coast ranges are well watered, and along the coast through Washington,



east of the 100th meridian, crossing the middle of North and South Dakota and Nebraska, has sufficient rainfall for agriculture. In most of this region the annual precipitation varies from 40 to 60 inches, which is evenly distributed throughout the year, making this region well suited to agriculture.

A small region in the eastern part of North Carolina, and another area north of the Gulf of Mexico, have over 60 inches. The northern half of Illinois, Wisconsin, Minnesota, Iowa, most of Kansas, Missouri, Oklahoma and the eastern half of Texas have from 20 to 40 inches of rain, which assures crops; but west of this region the annual precipitation varies from 10 to 20 inches, and agriculture can be successfully prosecuted only by irrigation. However, large areas are well adapted to grazing, since there is sufficient moisture to produce a good growth of grass. The great plateau between the mountains is arid, and the southern half of it, including nearly all of Nevada, the

Oregon and the northern part of California, there is a region which receives over 60 inches of rain during the year.

Mineral Resources

The minerals of the United States constitute one of its chief sources of wealth, and in extent and variety they exceed those of any other country. With the exception of some coal and petroleum, most of the valuable minerals are found in the mountainous regions, and there the mining industry is most fully developed. The important mineral fuels are coal, petroleum and natural gas; the chief metals are iron, gold, silver, copper, lead, zinc and quicksilver.

Coal. The most extensive coal measures are found in the central part of the Appalachian highlands, including Pennsylvania and West Virginia and extending westward through the southern part of Ohio, Indiana and Illinois. There are also extensive coal measures in Missouri and Iowa, and areas

of lesser extent occur in North Dakota, Montana, Wyoming, Colorado, Utah and New Mexico. There are also valuable coal measures in Alaska. In all, the area of coal measures is almost 300,000 square miles. By far the greater portion of this area contains bituminous coal, but the anthracite variety is confined within the boundaries of Pennsylvania. The United States produces more coal than any other country, the output being about one-third the entire output for the world; in 1921 nearly 500,000,000 tons.

Petroleum. Petroleum ranks next to coal in importance as a mineral fuel, and the oil industry is becoming one of the gigantic businesses of the country. The chief fields are found in western Pennsylvania, West Virginia, Ohio, Indiana, Kansas, Colorado, Texas, Oklahoma and the southern part of California. The annual output for the entire country is nearly 500,000,000 barrels, which exceeds the quantity produced by any other country.

Natural Gas. Natural gas occurs in usable quantities in Pennsylvania, Ohio, Indiana and Kentucky, and in smaller quantities it is found in a number of other states. It is of great advantage, since it furnishes the cheapest and most convenient fuel, especially for many manufacturing purposes, such as smelting iron and steel and manufacturing glass. Unfortunately much of this gas has been wasted.

Iron. Iron ranks first in value and importance among the metals produced within the country. The great deposits of ore are in Michigan and Minnesota, around Lake Superior; in eastern New York; in Pennsylvania; in Alabama, and Georgia and in southern Missouri, in the Ozark plateau. Deposits of less importance are quite widely distributed, especially in the Rocky Mountain region. Minnesota and Michigan are the leading states in the production of iron ore, and the great centers of iron manufacture are naturally where iron ore and coal can be most cheaply brought together. These are Pennsylvania, Ohio, Illinois, Indiana and Alabama. The United States now leads all other nations in the production of iron and steel, her average annual output of pig iron being about 30,000,000 tons.

Gold and Silver. All the important gold and silver mines are located in the Rocky Mountain region, throughout which the ores are quite generally distributed. Present

methods of extracting the metals from the ore enable miners to work with profit at quantities of low grade ores that were formerly considered worthless, and this has increased the output of both metals. The annual production of gold, including Alaska, is about \$60,000,000, and this amount is exceeded only by the mines in South Africa. The leading states in the production of gold are Colorado, California, Nevada, Utah, South Dakota, Idaho, Arizona and New Mexico, and these also contain the chief silver mines. In production of silver, the country is surpassed only by Mexico.

Other Metals. The United States produces two-thirds of the world's supply of copper. The most important mines are located in Michigan, on the shore of Lake Superior; in Montana, and in Arizona. Lead is mined in Colorado, Idaho, Illinois, Iowa, Kansas, Missouri, Utah and Wisconsin, and the United States produces more than any other country. Lead and copper ores are frequently found combined with silver ore. Zinc is also found in Illinois, Kansas, Missouri, New Jersey and Wisconsin, the Kansas, Missouri, and Wisconsin mines being the largest producers. Quicksilver, is found in California, which produces about all of that substance mined within the country. The United States produces about one-half of the world's supply of aluminum, the reduction works being at Pittsburgh and Niagara Falls.

Building Stones. Limestone is very generally distributed throughout the country and is used for a great many purposes, such as the manufacture of lime and the construction of foundations for buildings and of piers for bridges; the finer varieties, such as those obtained in Indiana, are often used for the exteriors of buildings, or when dressed, for trimmings in buildings constructed of other stone or brick. Granite is found in large quantities in the New England states, particularly Maine, New Hampshire and Vermont; there are also large quarries in Minnesota and other states. This is used extensively for building purposes and for tombstones. Granite is very widely distributed through the mountainous regions, and the Rocky Mountain plateau contains sufficient to supply large demands, whenever transportation facilities will warrant working the quarries. Marble is extensively quarried in Vermont and Georgia, and to some extent it is found in Tennessee and other states. The United



Sugar Cane



Peanut



Pineapple



Tobacco



Oats



Cotton



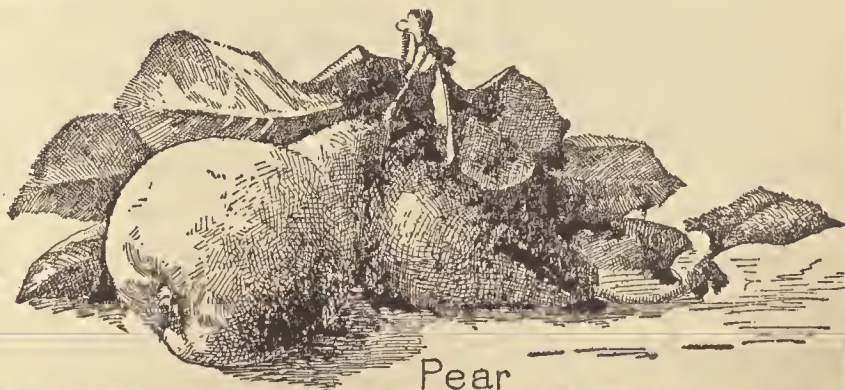
Apple



Potato



Peach



Pear

PLANT LIFE OF THE UNITED STATES

See, also, full-page illustration, Plant Life of North America, in article North America.

States produces more marble than any other country. There are large quarries of slate in Vermont, Pennsylvania and several other states. This stone is used for finishing interiors and for roofing. Clays of suitable quality for the manufacture of brick and tile and for pottery are widely distributed.

Miscellaneous Minerals. Gypsum is found in many localities, and salt is obtained from the waters of salt springs and wells, New York and Michigan being the leading states in its production. The manufacture of salt is an important industry in these states.

Vegetation. The plant life of the United States is characteristic of that of the temperate regions. Originally fully one-third of the country was covered with forests; but in the Appalachian Highlands and the Great Lake region, many sections have been almost wholly denuded, to supply the demand for lumber. In general, the forest areas include the Appalachian Highlands; the region bordering on the south of the Great Lakes and extending westward to the eastern boundary of the valley of the Red River of the North; the region along the Gulf of Mexico, including the eastern third of Texas and most of Arkansas, and the region occupied by the Cascade and Coast ranges of mountains, extending southward from the Dominion boundary as far as the central part of California.

The Appalachian forests are characterized by a great variety of hard wood, such as oak, maple, ash, beech and birch. There are also many cone-bearing trees, including spruce, hemlock and the white pine, in the north, and the yellow pine and the cypress, in the south. The forests in the lake region formerly had a great abundance of white pine, which was interspersed with some hard woods, and those of the Pacific coast are notable for peculiar species of cone-bearing trees, which attain great size, particularly the Douglas fir, the redwood, the yellow cedar and the sequoia.

In addition to its forests the Appalachian Highland region and Atlantic coast plain have a great variety of smaller plants, many of which are useful, while many are desirable only because of their beautiful flowers. Among the latter are the flowering plants of the mint family, a great number of grasses and a number of shrubs. The great central plain is characterized by the growth of herbaceous plants, most of which belong to

the grass family. Many of these grasses are highly nutritious, and previous to the occupation of this region by white men they sustained vast herds of buffalo, which roamed over the prairies. Within the arid region of the Rocky Mountain plateau are found plants peculiar to desert areas. These consist almost wholly of species of sagebrush, bunch grass and buffalo grass, except in the southern portion of the plateau. Here many species of cactus are found, some of them growing to great size. The Pacific slope is characterized by vegetation peculiarly its own, containing a number of species which are tropical or semitropical in nature. Among these are several palms. The southern parts of Texas and Florida have a number of species belonging to the semitropical regions, and the vegetation of Florida very closely resembles that of the West Indies. Two plants discovered in America have become of great economic importance. These are maize, or Indian corn, and tobacco. The cultivated plants are described under their respective titles, and the areas that they occupy are more fully outlined under the subhead *Agriculture*, in the articles treating of the various states.

Animal Life

The native animals of the United States include a large number of species. Among these are 310 species of mammals, 756 species of birds, 816 species of fish, 257 species of reptiles and over 1,000 species of mollusks. Among the larger quadrupeds of the carnivorous order are bears, several varieties of wolf, the puma, or mountain lion, the wildcat, the lynx and the coyote. Among the ruminating animals, various species of deer, the buffalo, the mountain sheep and the pronghorn are the most important. Of these, the buffalo and the mountain sheep are peculiar to North America. Both are now protected in the game preserves of the national parks. There are many species of rodents, of which the beaver is the largest. This animal is also nearly extinct and is found only in the most unfrequented regions of the country. The prairies abound in gophers and prairie dogs, and various species of squirrels frequent nearly all parts of the country. Among the large birds of prey are the eagle, the hawk and various species of owls. The most important water fowl include the Canada goose, the pelican and ducks. Other game birds of



Porcupine



Hare



Coyote



Deer



Beaver



Raccoon



Crane

ANIMALS OF THE UNITED STATES

See, also, full-page illustration, Animals of North America, in article North America.

importance are the wild turkey (now nearly extinct), various species of grouse and pigeons. Song birds exist in large numbers and are found in all parts of the country.

Furs and Fish. It was fish that first drew the French to America, and we might say that it was furs that kept them there. Lured by the profits to be derived from buying furs from the Indians, they explored all of Canada as far west as the head of Lake Superior and much of the northern part of the interior of the United States. From those early days to the present, the fur trade has been a source of income to the inhabitants of the forest and mountainous regions of the United States, as well as to those of Canada. So diligently have the hunters pursued the most valuable fur-bearing animals—the beaver, the otter and the fox—that these have nearly disappeared from the land. But the mink, the muskrat and the skunk are still found, and they furnish the greater part of the fur marketed in the United States. Alaska is valuable for its furs, especially the fur of the seal, but the seal fisheries have been greatly restricted by the government, to prevent the extermination of these valuable animals. Fur farms have been established in some of the islands off the Alaskan coast and in Prince Edward Island, and here the valuable silver and black fox are raised in captivity.

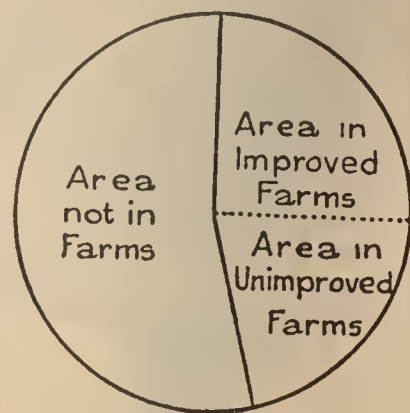
The fisheries of the United States give employment to over 220,000 persons, and the value of the yearly output is about \$125,000,000. Cod, mackerel, lobsters and oysters are the chief products of the Atlantic coast fisheries, and salmon leads on the Pacific coast. The catch on the Great Lakes includes whitefish, lake trout and sturgeon.

Agriculture

General Survey. For more than a century the United States has been the leading agricultural country of the world, and not one-half of the agricultural resources have been developed. The mountains and large areas of arid land are not suited to the growing of crops, but some of these lands offer good pasturage, and upon them millions of cattle, horses and sheep are raised. In 1910 less than one-half of the land was in farms, and only a little more than one-half of that in farms was under cultivation. In 1921 there were in the country about 543,000,000 acres of unappropriated and unsurveyed land (see LANDS, PUBLIC). This is an

area more than three times the area of Texas, and much of it will yield the farmer good returns for his investment and labor.

The United States has the largest acreage of cultivated land of any country in the world except possibly, China, for which statistics are not obtainable. The crop acreage of the United States exceeds that of all the great countries of Europe combined, excluding Russia. Of still greater significance is the acreage per capita of population, which in the United States is 3.5 per person, while in European countries it is from 1.5 to 1, and in the United Kingdom only 0.4. In other words, there is 8.4 times as much land per person in crops in the United States as in the United Kingdom, and the improved land per person is much more than this.



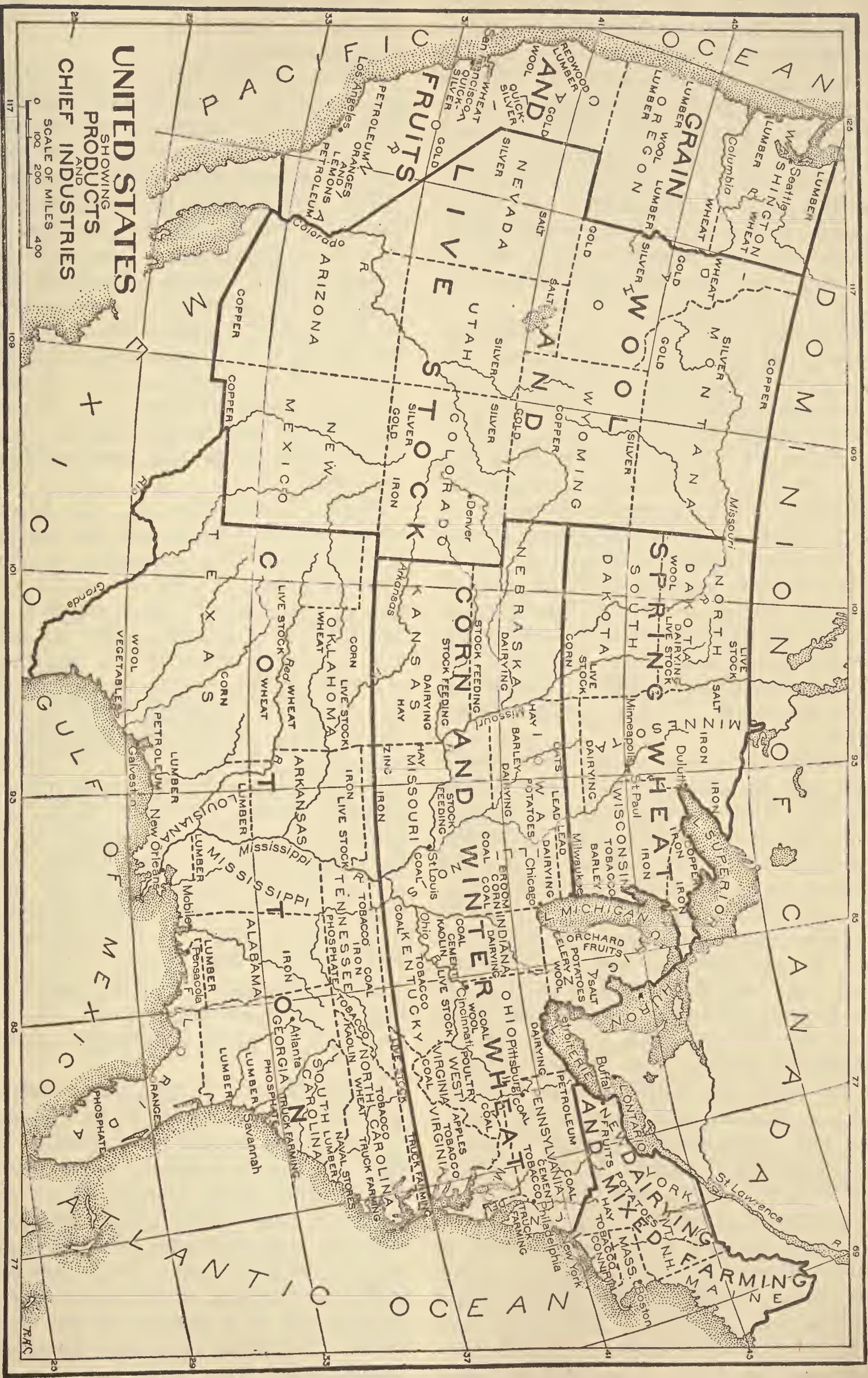
RELATIVE PROPORTIONS OF LAND, IMPROVED AND UNIMPROVED

With reference to the food supply of the United States, the Department of Agriculture at Washington makes the following statement:

The United States is practically independent of the rest of the World in the food supply, except for coffee, tea, sugar, cocoa, bananas and olive oil; and the principal source of supply of these food products, except tea and olive oil, is found in the western hemisphere.

Of all the cereals except rice, the United States produces more than it consumes. The United States produces and consumes about 70 per cent of the world's corn, over 25 per cent of the world's oats, between 15 and 20 per cent of the world's barley. Of the world's rye, the United States produces only about 2 per cent and of the world's rice less than 1 per cent.

Agricultural Regions. The great agricultural regions are the prairies of the Mississippi Basin, east of the 100th meridian; the land bordering on the Gulf of Mexico, and the valleys of the Pacific slope. The Appalachian region is not so fertile as the others. However, in the valleys and on other low lands there are many valuable farms. In this part of the country the raising of cereals is not profitable, and the region cannot compete with the Mississippi Basin; hence the region is characterized by small farms, whose occupants are engaged in a variety of inter-



UNITED STATES

SHOWING
PRODUCTS
AND

CHIEF INDUSTRIES

SCALE OF MILES
0 100 200 400

ests. The arid region, including the states within the Rocky Mountain plateau and the southern part of California, embraces nearly one-third of the country. Over most of this the soil is fertile, and wherever water can be supplied for irrigation, abundant crops are raised. The national government has undertaken works of gigantic proportions, for the purpose of reclaiming as much as possible of this region. The valleys of the Pacific slope, where well watered, produce abundant crops of all plants which can be raised in that climate.

The product map on page 3683 shows that agriculturally the country is divided into six regions. The words in large type indicate the chief crop or industry in each region. Those in smaller type indicate other products and industries. A careful study of this map will show that the northern New England states and New York are chiefly engaged in mixed farming and dairying, and that each of the other regions is devoted to one or more principal crops or industries, each of which is worthy of special consideration. For the development of agriculture in the country, see *AGRICULTURE*, and for more particular accounts, see subhead *Agriculture*, under the articles treating of the different states.

Cereals. As a whole, cereals constitute the most important agricultural product of the country. The great region devoted to these crops comprises the states of the Mississippi Basin, portions of Pennsylvania and West Virginia, and portions of Oregon, Washington and California. The leading wheat-producing states are Minnesota, North Dakota, Kansas, Nebraska and South Dakota. More than half the crop is winter wheat. The annual crop varies from 750,000,000 to about 850,000,000 bushels. In 1922 it was 856,000,000 bushels. The leading corn-producing states are Illinois, Iowa, Missouri, Indiana, Nebraska and Kansas. The annual crop varies from about 2,500,000,000 bushels to 3,200,000,000 bushels. In 1922 it was 2,890,000,000 bushels. The leading states in the production of oats are Illinois and Iowa. The crop amounts to about 1,200,000,000 bushels yearly. Rice is produced in Louisiana, South Carolina, Texas, Georgia, North Carolina and California. The annual crop is about 40,000,000 bushels. Considerable buckwheat is grown in some states, and some of the Northern states also produce more or

less rye; but in the production of this grain the United States is far behind some of the European countries.

Cotton and Tobacco. Cotton is the chief product of the Southern states and the one from which they derive the greatest amount of money. The annual crop amounts to about 11,000,000 bales, of 500 pounds each.

The leading states in its production are Texas, Mississippi, Georgia, Alabama, South Carolina and Arkansas. Tobacco is also an important crop, and it is generally distributed over the country. The amount grown yearly is about 1,200,000,000 pounds. The leading states in tobacco production, in the order of their importance, are Kentucky, North Carolina, Virginia, Ohio, Tennessee, Pennsylvania and South Carolina. A number of other states also raise considerable quantities.

Fruit. Horticulture is an important branch of agriculture, and the raising of fruit is the leading occupation in Florida, Delaware, parts of New Jersey, the western part of New York and the southern and central parts of California, while its production engages the attention of a large number of farmers in Washington, Oregon, the mountainous part of Montana and a number of other states. In Florida pineapples and oranges are the chief fruits. In California oranges, lemons, apricots, grapes, prunes and almonds, among the larger fruits, are of greatest importance, while grapes and small fruits are raised in large quantities. Grapes and peaches are grown extensively in New York, and apples and peaches are produced in New York, Michigan, Colorado, Missouri and numerous other states. Small fruits, including raspberries, blackberries and strawberries, are found in nearly all parts of the country where there is sufficient rainfall for their growth.

Other Crops. In Minnesota, Wisconsin and some other Northern states, considerable flax is grown, mostly for the seed. Sugar cane is raised in Louisiana and a few other of the Gulf states, and the sugar beet is grown in many of the states. Potatoes are raised in large quantities in Wisconsin, Minnesota and New York. Sweet potatoes are grown in Virginia, in the southern part of Illinois and in a number of the Southern states. Vegetables are grown for market in Delaware and New Jersey and in nearly all states in which large cities are located. New

York and the states on the Pacific slope are noted for their production of hops.

Live Stock. Much of the arid region is well suited to grazing, and in this section of the country large herds of cattle and sheep are raised. Texas leads in the production of cattle, and Wyoming is first in the production of sheep. Some of the corn states, particularly Iowa and Illinois, are noted for their beef cattle and hogs. New York, the northern New England states, Iowa, Illinois and Wisconsin are extensively engaged in dairying, and the value of the dairy products is great. The annual production of milk in the United States amounts to 85,000,000,000 pounds.

Poultry. The raising of poultry is an important branch of agricultural industry, and it engages many people in all parts of the country, though it has received less attention on the Pacific coast than in other regions. About 500,000,000 fowls are raised annually and 1,600,000,000 eggs are produced. The annual value of the poultry products is about \$250,000,000. The leading poultry states are Illinois, Missouri, Iowa, Ohio and Indiana.

Manufacturing Industries

Causes of Development. During the early period of existence as a nation everything was made by hand, and the clothing and other necessities for the family were produced in the home. The mother was housekeeper, spinner, weaver and tailoress; the father was farmer, carpenter, blacksmith and harnessmaker, and the traveling shoemaker came around once or twice a year and made shoes for the family. Gradually, these industries began to be separated. One family in the settlement made the cloth, one man did the carpenter work and another became a blacksmith. Shops were erected, and where there was water power simple machinery was installed. As the number of settlers increased, factories became more numerous and the distinction between trades more marked. Nevertheless, the growth of the manufacturing industries was slow until about 1860, and since that date, they have developed more rapidly than any other lines of industry. Now the United States is the leading manufacturing country of the world, producing more than one-third of the world's manufactured products.

The chief causes for this rapid development of the United States as a manufactur-

ing nation are the country's abundant agricultural resources, its mineral resources, its extensive forests, the remarkable transportation facilities afforded, the inventive genius of the people and the opportunities for an extensive trade between the states. The extent and variety of agricultural products assure an abundance of food supplies for the people, and the methods of agriculture are such that a comparatively small proportion of the inhabitants can supply food for the entire nation and also for export to foreign lands. This leaves large numbers free to engage in other occupations, and this enables a larger proportion of the people to engage in manufacturing industries than would be possible were the agricultural conditions such that nearly all were dependent for support upon their own efforts in tilling the soil.

The abundant supply of coal, iron and other useful metals makes the manufacture of many products convenient and comparatively cheap. This is particularly true of iron and steel and their products, while the presence of clay and various forms of building stone is of equal advantage in the construction of factories and other establishments connected directly or indirectly with manufacturing industries. The great forest areas provide an abundance of lumber and timber for all articles made of wood; hence this line of manufactures has been developed on a very large scale.

In addition to the coal for fuel, thousands of streams furnish abundant water power, and the invention of the electric motor has brought into use many power sites so far from manufacturing centers that the location of factories on them formerly was impracticable. Since electric power can be carried long distances without loss, it may operate factories hundreds of miles from its source. The perfection of the gasoline engine has greatly increased the power for propelling machinery. While not adapted to large factories this engine supplies power to many small industries.

The American people have always been noted for their mechanical ingenuity, and they have produced a great number of machines and devices which have greatly influenced, and in some cases have revolutionized, the industries of the world. Chief among these are the cotton gin, the sewing machine, the steamboat, the reaping machine,

the telegraph and the telephone. To these, many others of lesser importance might be added. Their combined effect has been to simplify and cheapen many processes of manufacturing, transportation and communication, all of which have aided in the development of manufacturing industry.

The freedom of commerce between the states is one of the greatest advantages enjoyed by the country. In no other region of the world is there such an extent of country entirely free from tariff barriers. In addition to this, the country embraces localities whose needs differ widely; consequently there is a demand for interchange of products among these sections, and these conditions have combined to build up a domestic commerce much greater than that known in any other country in the world. This has led to the development of various lines of manufactures. No other country has such extensive and numerous transportation lines, both by water and by rail; hence the carrying of commodities from one section to another is comparatively easy and cheap.

Location of Manufacturing Districts. The manufacturing districts are very unevenly distributed over the country. In general, those states east of the Mississippi River and north of the Ohio are the leading manufacturing states, and more than four-fifths of all the manufactures in the country are produced within this territory. Without this limit are a few important manufactures, and these are being rapidly developed. Among them are the iron industries of Alabama and Georgia and the cotton industries of Alabama, Georgia, North Carolina and South Carolina. Some of the large cities on the Mississippi are also important manufacturing centers. Chief among these are Saint Louis, Saint Paul and Minneapolis. On the Pacific coast, lumbering, the manufacture of furniture and some other industries are fully developed, while others are increasing in number and importance from year to year.

Leading Industries. Among the many manufactured products of the country the following are the most important: Food products, including flour and meat; iron and steel; textiles; automobiles; lumber and its allied products; leather and its finished products; metals other than iron and steel, with various allied products, and paper. To the manufacture of these commodities should be

added printing and publishing, as another major industry.

Food Products. The time was when the farmer carried his wheat to the local mill, brought home the flour, and the wife cooked all the food for the household, but that time has passed, and now much of the food consumed in rural districts as well as the cities is prepared in large establishments. In addition to flour and cured meat, canned goods, breakfast foods, biscuits and numerous other articles turned out by the wholesale bakeries are produced in large quantities and their annual value amounts to hundreds of millions of dollars.

While the amendment to the Constitution prohibiting the manufacture of intoxicating beverages has greatly curtailed the output of these products, the manufacture of so-called "soft drinks," as a substitute for "hard liquor," is a large industry, and it bids fair to grow in importance.

Iron and Steel. The United States produces more iron and steel than any other country. At the outbreak of the World War (1914) the output of pig iron and steel in the United States was nearly equal to the combined output of Germany, France and Great Britain, the next three largest producers. The leading states in the manufacture of iron and steel products are Pennsylvania, Illinois, Ohio and Indiana. Minnesota and Michigan lead in the production of iron ore.

Textiles. New England is the great center for the manufacture of cotton goods, and Massachusetts is the leading state in this industry. Outside of New England, North Carolina, South Carolina, Georgia and Alabama have established extensive cotton mills. In the output of her cotton goods, the United States is second only to Great Britain. Next in importance to the manufacture of cotton goods is the manufacture of woolens, including carpets and hats. Massachusetts, Pennsylvania and Rhode Island are the states in which this industry is principally located, Philadelphia being one of the greatest centers of carpet manufacture in the world. In the manufacture of silk goods the United States is the leading nation, followed by France. The great centers of the industry are in New Jersey and Pennsylvania. Extensive factories for the production of knit goods are also found throughout the New England and North Atlantic states.

Lumber. The lumbering industries naturally center in those states containing extensive forest areas. It is now largest in Oregon and Washington.

Leather. Pennsylvania ranks first in the tanning and finishing of leather, while Massachusetts is the leading state in the production of boots and shoes. Perhaps in no other industry is the effect of American invention and perfection of organization better seen than in the manufacture of boots and shoes. Owing to the invention of a number of ingenious machines, this industry has been highly organized, and the United States produces more boots and shoes than any other country.

Paper. In the manufacture of paper the United States also leads the world. Much of this product is now made from wood pulp, which is generally manufactured in the states that have large supplies of suitable timber for this purpose. The annual output of paper and wood pulp products exceeds \$800,000,000.

Automobiles. Although it is one of the youngest industries in the country, the manufacture of automobiles has reached third place among the manufacturing industries. In 1917, 4,242,000 automobiles and trucks were made in the United States, and the value of all automobiles owned in the country was \$800,000,000. After 1917 the great war curtailed production. The leading states in the industry are Michigan, Ohio and Illinois. Detroit is the world's greatest center for the manufacture of automobiles.

Other Industries. Connecticut leads in the manufacture of small articles, such as needles, pins, buttons, clocks, and various kinds of hardware. The great watch factories of the country are at Waltham, Mass., and Elgin, Ill. The manufacture of electrical apparatus and appliances is extensive and still on the increase. Before the World War the United States depended upon Germany for most of its chemicals and dyestuffs, but the war prevented the exportation of these products from Germany, and this condition stimulated manufacturing chemists to supply the market with American-made goods. The war also caused a great advance in shipbuilding, placing the country second only to Great Britain in this industry. In the manufacture of agricultural implements and machinery the United States surpasses every other nation. This industry is most extensive in

Illinois, Chicago being the leading center. Other states in which it is large are Ohio, New York and Wisconsin. The yearly output is over \$297,000,000. The annual production of clay, glass and stone products is over \$1,000,000,000. Besides these larger industries there are many smaller ones, considered as miscellaneous, whose annual output exceeds \$1,000,000,000 in value, while the hand trades, or those occupations in which the articles are produced by the use of hand tools, have an annual output exceeding \$1,184,000,000.

Transportation and Communication

Waterways. The United States has over 12,000 miles of seacoast and more than 18,000 miles of inland waterways. Formerly the inland waterways were of the greatest importance, since by their means the interior of the country found an outlet to the sea. The most important systems of these waterways are those of the Mississippi River and tributaries and the Great Lakes. Since the construction of railways, the river systems have become less valuable; but the completion of canals, by means of which steamers of deep draft can pass from the lakes to the ocean through the Saint Lawrence River has rendered this waterway of great importance. In connection with it, the construction of the Erie Canal, early in the nineteenth century, opened the way for the transportation of commodities between the Atlantic seaboard and the interior. The important canals are described under their titles.

Railroads. The first railroads of importance in the United States were constructed in 1830 and 1832, and at the close of the latter year there were 23 miles of railway in the country. In 1916 the mileage was over 266,000 or more than that of the entire continent of Europe. It is nearly one-third of all the mileage of the world. Naturally the older states contain the larger number of lines; the portion of the country east of the Mississippi River is fully supplied with railways, so that nearly all towns have convenient means of communication. In the Appalachian region, the longest lines extend approximately north and south; west of these mountains the general trend of the railways is east and west; in the Mississippi Valley there are a number of north and south lines, connecting Chicago and Saint

Louis with important commercial ports on the Gulf of Mexico. Some of these lines extend into Mexico.

Six transcontinental lines now extend to the Pacific coast, and the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific, only a short distance north of the international boundary line, also render some service to the inhabitants of the northern part of the country. Electric railways connect many towns situated within a few miles of one another, and these systems are being extended to the rural districts, especially in the eastern part of the country and the southern part of California. On the whole, the country is well supplied with water and rail transportation.

Roads. The development of railways and their importance in the industrial systems of the country has caused neglect of wagon roads, and in the construction of these important means of transportation the United States is far behind European countries. In most states the roads are poor, and in some states, during certain seasons of the year, they are well-nigh impassable.

In 1893 the United States Department of Agriculture inaugurated the Good Roads Movement, and since that time the national government has given some assistance in improving the public highways. In 1914 Congress appropriated \$25,000,000 for the construction and improvement of roads, and in 1918 this amount was increased to \$266,750,000, to be spent within the next three years. This money is divided among the states on condition that each state must appropriate as much money as it receives from the national government. This will create a fund sufficient to improve all the roads in the country.

Communication. Telegraph and telephone lines are found in all parts of the country, and no town of importance is now without one or both of these conveniences. Telephone lines extend through all the principal rural sections, most farm houses have a telephone. The postal system is also one of the best in the world, taking rank with the systems of Great Britain, Germany and France, and meeting all of the reasonable demands of the country.

Commerce

Domestic Commerce. The domestic commerce of the United States is larger than that of any other country and far exceeds

its trade with foreign nations. The widely separated sections of the country, differing from one another in climate, soil and products, create a great demand in each section for the products of the others, and in the supplying of this demand an extensive commerce has sprung up. The amount of this trade cannot be obtained, since no record is kept of the shipments of merchandise that are not entered at customhouses; but that it is very great and constitutes one of the leading industries of the country is evident to all who are conversant with commercial and industrial systems.

Foreign Commerce. Before 1915, in its foreign commerce the United States was exceeded by Great Britain and Germany and ranked third among the great commercial nations. But the World War created such a demand for American products that it advanced to first place. For the year ending June 30, 1917, the exports amounted to \$6,290,048,394 and imports to \$2,659,355,185. Under normal conditions the exports are divided among the various products as follows: Agricultural products, 62 per cent; manufactures, 30 per cent; forest products, 4 per cent; mining products, 3 per cent. The imports have the following apportionment: Raw material, 38 per cent; food and domestic animals, 21 per cent; manufactures, 16.79 per cent; luxuries, 14.47 per cent.

Most of the foreign trade was carried on with the European nations in the following order of importance: The United Kingdom, Germany, France, Netherlands, Belgium. Italy and Russia also have a considerable share. Of Asiatic nations Japan has the first place and China the second. Europe takes about three-fourths of the exports and supplies one-half of the imports. Of the other foreign nations, Canada is the most important in North America, and Brazil, Argentina and Chile lead in South America. The great seaports engaged in European trade are New York, Boston, Philadelphia and Baltimore, while those engaged in trade with China, Japan and the Philippines are San Francisco, Seattle and Tacoma. The Panama Canal has also brought the Atlantic ports much nearer these far-eastern countries.

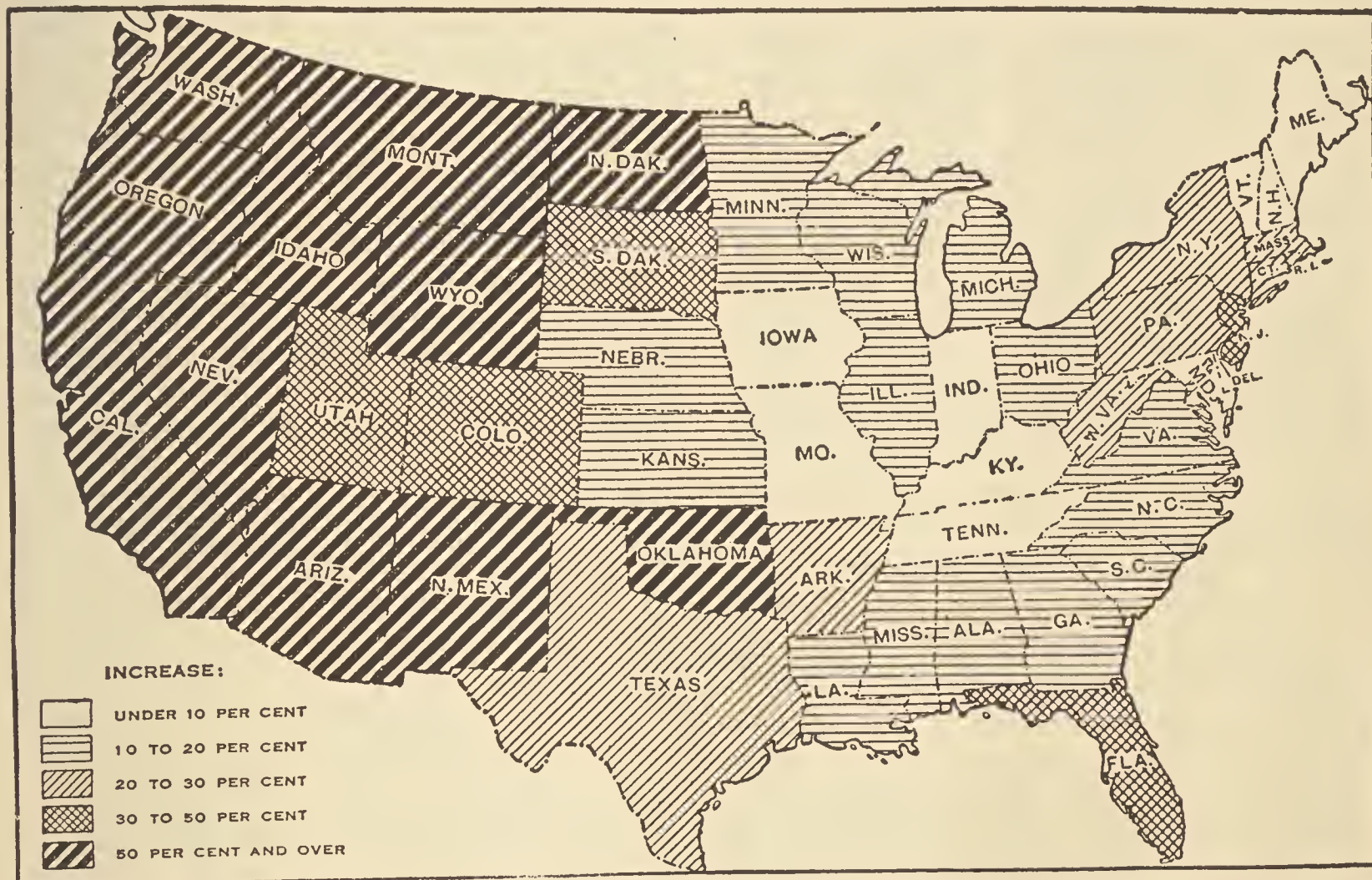
While American products are found in all countries of the world, the foreign commerce of the United States has until recently been crippled, from the fact that nearly

all of it is carried in the ships of other nations, American vessels being engaged almost entirely in the coastwise trade. During the World War the number of American merchant ships was greatly increased, and most of the new ships were engaged in foreign trade, placing the country again approximately in the position it held before the Civil War.

The People

Colonial Period. During the Colonial Period settlements were made by English, Scotch, Irish, Swedes, Dutch, French and Germans, but the people from the British

tion, by their force of character and superior education they impressed their ideals upon the others, and at the beginning of the Revolutionary War the 2,000,000 or more inhabitants of the English colonies were firmly united. Moreover, during this century and a half of their existence the political ideas of the colonies were developed and established so firmly that there was little danger of their being changed by immigration in the years that followed, and the country entered upon its national existence with a population firmly united as to nationality and social and political ideas.



MAP CLASSIFYING STATES WITH RESPECT TO THE PERCENTAGE OF INCREASE OF POPULATION BETWEEN TWELFTH AND THIRTEENTH CENSUSES.

Isles far outnumbered all others. With the exception of the Germans, about 100,000 of whom settled in Pennsylvania, the other nationalities in time blended with the English, so that in language, customs, government and commercial methods the colonies were thoroughly Anglo-Saxon.

Many of the first settlers were people of exceptional character and ability, who were driven to the New World by civil or religious persecution. This applies to the Quakers and Germans in Pennsylvania and the Huguenots of South Carolina, as well as to the Puritans of New England. Although these people were fewer in number than those who came to better their condi-

Increase in Population. The first national census was taken in 1790. At that time the United States contained in round numbers 4,000,000 inhabitants. About one-fifth of these, or 750,000, were negroes. The growth in population by decades is shown in the table on page 3690.

The greatest growth has been in the central and western states, where the increase has been unusually large. This is due to the fertility of the soil in the Mississippi Valley and the opportunities and advantages offered by a new country. These attracted large numbers of immigrants.

Movement Westward. In 1790 the center of population was 23 miles east of Baltimore.

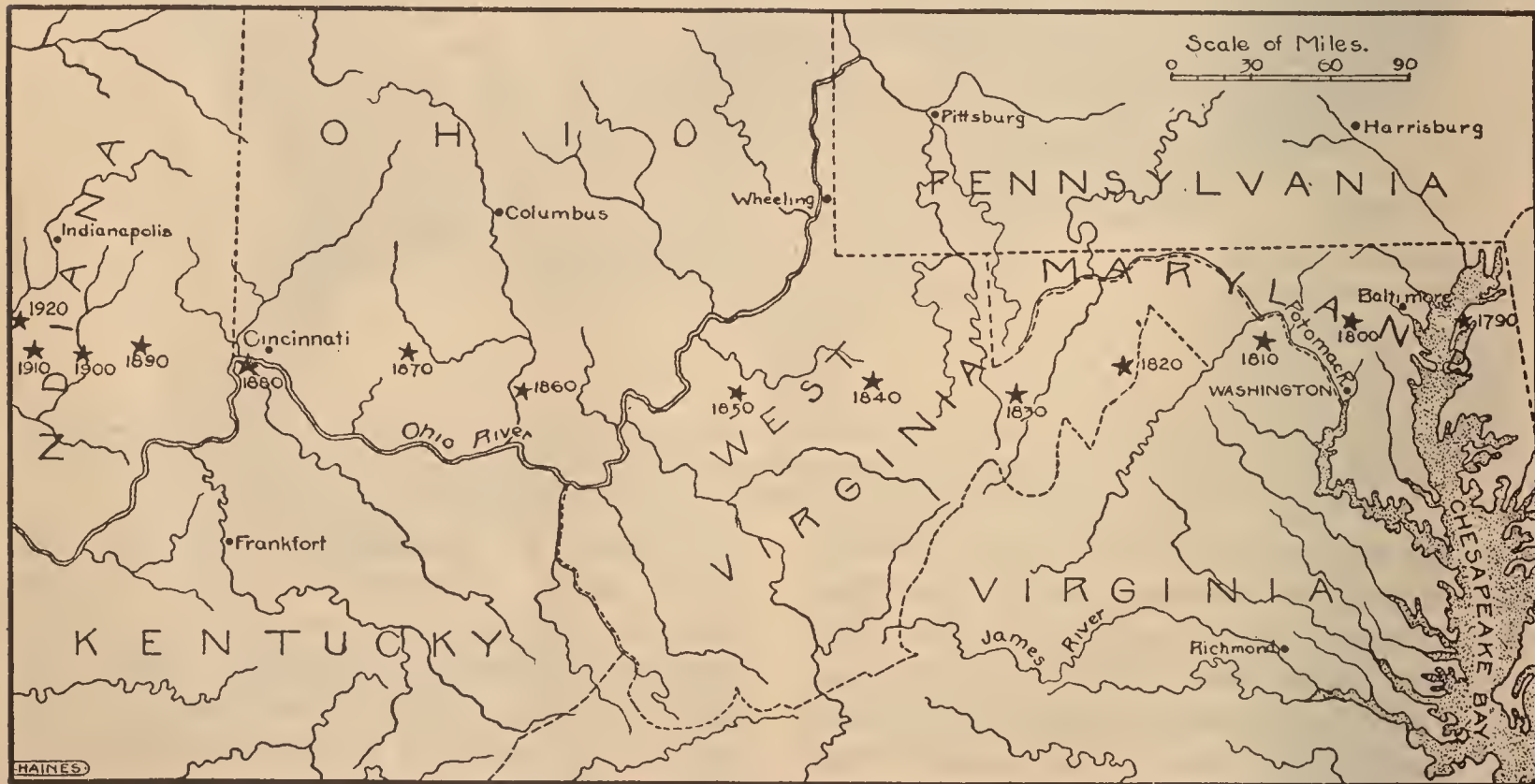
The center moved westward with varying degrees of rapidity, as indicated by the stars on the map printed on this page. The

| CENSUS | POPULATION, excluding Alaska, Indian reservations and island possessions. | INCREASE | |
|-----------|--|------------|----------|
| | | NUMBER | PER CENT |
| 1920..... | 105,710,620 | 13,738,354 | 14.9 |
| 1910..... | 91,972,266 | 15,977,691 | 21.0 |
| 1900..... | 75,568,686 | 12,946,436 | 20.7 |
| 1890..... | 62,622,250 | 12,466,467 | 24.9 |
| 1880..... | 50,155,783 | 11,597,412 | 30.1 |
| 1870..... | 38,558,371 | 7,115,050 | 22.6 |
| 1860..... | 31,443,321 | 8,251,445 | 35.6 |
| 1850..... | 23,191,876 | 6,122,423 | 35.9 |
| 1840..... | 17,069,453 | 4,203,433 | 32.7 |
| 1830..... | 12,866,020 | 3,227,567 | 33.5 |
| 1820..... | 9,638,453 | 2,398,572 | 33.1 |
| 1810..... | 7,239,881 | 1,931,398 | 36.4 |
| 1800..... | 5,308,483 | 1,379,269 | 35.1 |
| 1790..... | 3,929,214 | ..... | ..... |

center of population has varied slightly from time to time from an east and west line, and during the period in which the states in the Mississippi Valley and farther west were being settled it moved forward more rapidly than it did during the decade between 1900 and 1910. During this decade

Island, with 508.5 people to the square mile, was the most densely populated; Massachusetts, with 419, was second; New Jersey had 338; Connecticut, 231; New York, 191; Pennsylvania, 171; Maryland, 130; Ohio, 117. Delaware, 103; Illinois, 100.7. All other states had fewer than 100 people to the square mile. Wyoming, with 1.5, and Nevada, with 0.7, were the least densely populated. The percentage of increase from 1900 to 1910 is shown in the accompanying map, taken from *Bulletin* 109 of the Bureau of the Census. By this it will be seen that the movement of population has been to the states west of the Mississippi. Washington leads, with an increase of 120.4 per cent; Oklahoma, with an increase of 109.7 per cent, is second, and Idaho, with an increase of 101.3 per cent, is third. The increase in population since the census in 1910 will make but very slight changes in these figures.

Growth of Cities. Since the organization of the government, the population of cities and towns has increased far more, proportionately, than the population of the country at large, and this proportion has



MOVEMENT OF THE CENTER OF POPULATION

the center of population advanced westward about 39 miles, being in 1910 in the city of Bloomington, Ind.

Density. Had the population been evenly distributed over the country, excluding Alaska and Hawaii, in 1910, there would have been thirty-one people to the square mile. The average density was 30.9. Rhode

been constantly increasing. In 1790, 3.4 people out of every 100 lived in cities of 8,000 or more inhabitants. In 1840 this proportion had increased to 8.5 per 100. In 1850, one-eighth of the people dwelt in cities of 8,000 or over; in 1890, over one-fourth, and in 1910, over one-third. This rapid growth of cities is due, principally, to the

establishment of the factory system, necessitating the bringing together of a large number of operatives; to increased facilities of transportation, to immigration, and to a desire for better schools.

The following table includes the seventy largest cities of the United States. The population statistics are government census returns for 1920:

| | |
|----------------------------|-----------|
| New York, N. Y. | 5,620,048 |
| Chicago, Ill. | 2,701,705 |
| Philadelphia, Pa. | 1,823,779 |
| Detroit, Mich. | 993,678 |
| Cleveland, O. | 796,841 |
| St. Louis, Mo. | 772,897 |
| Boston, Mass. | 748,060 |
| Baltimore, Md. | 733,826 |
| Pittsburgh, Pa. | 588,343 |
| Los Angeles, Cal. | 576,673 |
| Buffalo, N. Y. | 506,775 |
| San Francisco, Cal. | 506,676 |
| Milwaukee, Wis. | 457,147 |
| Washington, D. C. | 437,571 |
| Newark, N. J. | 414,524 |
| Cincinnati, O. | 401,247 |
| New Orleans, La. | 387,219 |
| Minneapolis, Minn. | 380,582 |
| Kansas City, Mo. | 324,410 |
| Seattle, Wash. | 315,312 |
| Indianapolis, Ind. | 314,194 |
| Jersey City, N. J. | 298,103 |
| Rochester, N. Y. | 295,750 |
| Portland, Ore. | 258,288 |
| Denver, Colo. | 256,491 |
| Toledo, O. | 243,164 |
| Providence, R. I. | 237,595 |
| Columbus, O. | 237,031 |
| Louisville, Ky. | 234,891 |
| St. Paul, Minn. | 234,698 |
| Oakland, Cal. | 216,261 |
| Akron, O. | 208,435 |
| Atlanta, Ga. | 200,616 |
| Omaha, Neb. | 191,601 |
| Worcester, Mass. | 179,754 |
| Birmingham, Ala. | 178,806 |
| Richmond, Va. | 171,717 |
| Syracuse, N. Y. | 171,667 |
| New Haven, Conn. | 162,537 |
| Memphis, Tenn. | 162,351 |
| San Antonio, Tex. | 161,379 |
| Dallas, Tex. | 158,976 |
| Dayton, O. | 152,559 |
| Bridgeport, Conn. | 143,555 |
| Houston, Tex. | 138,276 |
| Hartford, Conn. | 138,036 |
| Scranton, Pa. | 137,783 |
| Grand Rapids, Mich. | 137,634 |
| Paterson, N. J. | 135,875 |
| Youngstown, O. | 132,358 |
| Springfield, Mass. | 129,614 |
| Des Moines, Ia. | 126,468 |
| New Bedford, Mass. | 121,217 |
| Fall River, Mass. | 120,485 |
| Trenton, N. J. | 119,289 |
| Nashville, Tenn. | 118,342 |
| Salt Lake City, Utah. | 118,110 |
| Camden, N. J. | 116,309 |
| Norfolk, Va. | 115,777 |

| | |
|------------------------|---------|
| Albany, N. Y. | 113,344 |
| Lowell, Mass. | 112,759 |
| Wilmington, Del. | 110,168 |
| Cambridge, Mass. | 109,694 |
| Reading, Pa. | 107,784 |
| Fort Worth, Tex. | 106,482 |
| Spokane, Wash. | 104,437 |
| Kansas City, Kas. | 101,177 |
| Yonkers, N. Y. | 100,176 |
| Duluth, Minn. | 98,917 |
| Lawrence, Mass. | 94,270 |

Immigration. Previous to 1800 no statistics of immigration were kept. Good authorities, however, estimate that at the beginning of the Revolutionary War about one-fifth of the people were immigrants and that from 1790 to 1800 about 5,000 people entered the country each year. During the first half-century following the adoption of the Constitution, immigration was small; and previous to the Civil War, only about 1,000,000 foreigners had settled in the United States. After 1870 immigrants began to come by the thousands, and by 1910 they had added nearly 30,000,000 to the population. Previous to 1895 most of the immigrants were from the northern countries of Europe, the majority coming from the British Isles, Germany, Norway and Sweden. Most of them settled in the new states, in the northern part of the Mississippi Valley, where their descendants now constitute a thrifty, law-abiding and industrious people. Since that time, however, the character of immigration has almost entirely changed, and by far the larger proportion of immigrants come from Italy and Austria-Hungary, while smaller numbers are received from other countries of southern Europe. Since the beginning of the century, the tide of immigration has very materially increased.

In 1850 only 9.7 people in 100 among the population were foreign born, while in 1910 the proportion exceeded 14. For the year ending June 30, 1910, 1,041,570 aliens entered the United States, and each year thereafter until 1915 over 1,000,000 immigrants were received each year. Between 1820 and 1914 about 32,000,000 aliens entered the country, exclusive of temporary arrivals, a number equal to almost one-third the entire population. Immigration was greatly reduced during the World War. In 1914, the number of immigrants was 1,218,480; in 1915 it was 326,700, and for 1916 and 1917 the number was less than 300,000, because of the war which was being waged in Europe. In 1917 Congress passed a law restricting

immigration to those who could read at least one language. For a fuller account of this subject, see the article IMMIGRATION.

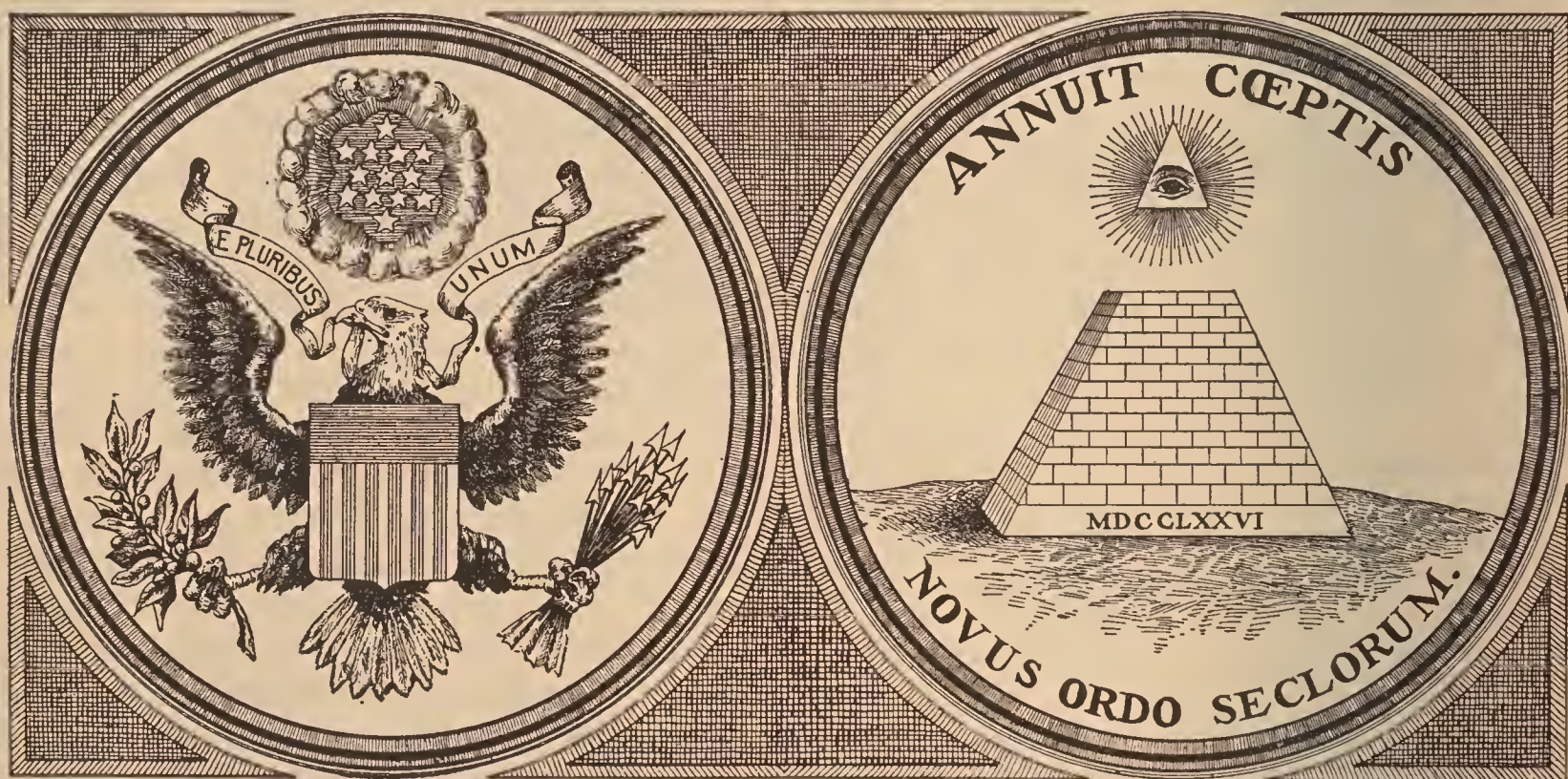
Color. In 1790 the negroes constituted one-fifth of the population and in 1910, less than one-ninth; that is, of the entire population, 9,827,763 were negroes. In 1920 the number had increased to 10,463,131, according to the census of the United States government.

The great majority of negroes are found in the states south of the Ohio River, including Texas and Arkansas, though bordering states contain large numbers. In South Carolina and Mississippi, the negroes outnumber the white population. In 1920 there were also 61,639 Chinese and 111,010 Japanese in the United States. The greater pro-

Germany, Switzerland, Scotland, Holland, France and England. In large cities and in some rural communities immigrants settle in communities and for years maintain their language and many of the customs of the Old World; but in most instances the children educated in the public schools become Americanized.

With very few exceptions, English is the language spoken throughout the country, and everywhere it is the official language of the land. After the United States entered the World War many states prohibited the teaching of any living language, except English in the public schools.

In 1900 the population was 76,303,387, not reckoning the outlying possessions. In 1910 it was 91,972,266. In 1920 the census report



GREAT SEAL OF THE UNITED STATES

portion of oriental immigrants are confined to the Pacific states. There were also in the country 244,437 Indians, most of whom were on reservations. The Indian population is gradually decreasing, as is also the Chinese. The number of Japanese increased more than 50 per cent in ten years, mostly in California and Washington.

Present Character. The population of the United States comprises representatives of nearly every race and nation, and the large cities are probably more cosmopolitan than any others in the world. Because of this characteristic, the percentage of illiteracy in the country is higher than it is in some of the European countries, namely,

for continental United States was 105,710,620, and for the outlying possessions, 11,995,307. The population of each of these possessions is given in the respective articles describing them.

Government

General Features. The national government began with the Continental Congress, which, after the Declaration of Independence, framed the first national constitution, known as the Articles of Confederation. This instrument, however, was soon found to be inadequate to the needs of the country and in 1787 the Constitution, establishing the present government, was framed. As organized under the Constitution, the govern-

ment of the United States is a federal republic, in which the states are self-governing, each having a republican form of government.

The powers of the national government are defined by the Constitution, and all powers not specifically delegated to the United States are reserved to the states and to the people. However, the states are prohibited from the exercise of certain powers, among which are making treaties with foreign nations, declaring war and coining money. There are other powers, also, which they are forbidden to exercise except by permission of the national government.

The national government is organized in three coördinate departments, legislative, executive and judicial.

While these departments, within certain limits, are independent of one another, each is so related to the others as to form, with them, an organic whole. For instance, laws must originate in the legislative department, but the president has the power of veto, and the judicial department can render any law null and void by declaring it unconstitutional. The legislative department also has power to impeach and try United States officers, including the head of the executive department, and the president cannot appoint to certain offices except by the advice and consent of the Senate. The relation of these departments to each other is shown in the diagram accompanying the article CIVIL GOVERNMENT, and the government of each state is described in the article on that state.

Legislative Department. The legislative department consists of a Congress, comprising a House of Representatives and a Senate. The House of Representatives consists of members apportioned among the states according to population, the apportionment being made every ten years. Each state has at least one Representative, whatever its population. The members are chosen at a general election, on the first Tuesday after the first Monday of November, in even-numbered years, and they hold their offices for two years. The apportionment in 1911 was one Representative to every 211,430 inhabitants, and the number of Representatives according to this apportionment was 435. The House of Representatives elects one of its members as the presiding officer, entitled *speaker*, for a term of two years. All bills for raising revenue must originate in this

branch of Congress, but in passing bills, the two houses must agree, and they have equal power to reject measures.

The Senate is composed of two members from each state, formerly chosen by the state legislature, but since the adoption of the Seventeenth Amendment, elected by popular vote for a term of six years. Members are so elected that the terms of one-third of the Senators expire every two years. The presiding officer is the Vice-President of the United States. The Senate has sole power to try cases of impeachment and to ratify treaties with foreign nations.

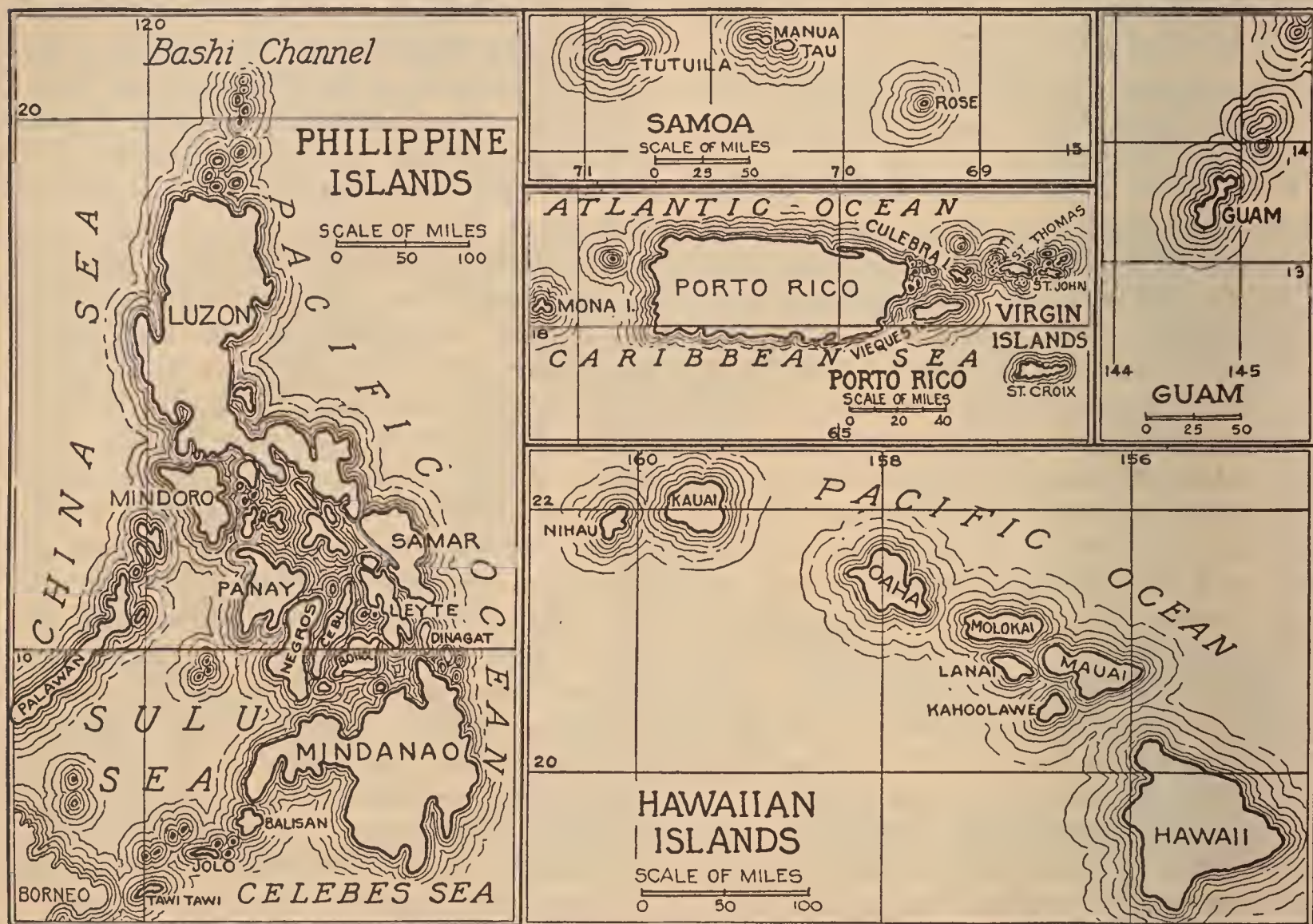
Executive Department. The executive department consists of the President, the Vice-President and such other officers as the President may select or as may be provided for by law. The President and the Vice-President are chosen by electors for a term of four years. In order that this branch of the government might be efficiently administered, Washington established, in 1789, the following departments: State, War and Navy, Treasury and Postoffice. Since then the following departments have been added: Interior, 1849; Justice, 1870; Agriculture, 1889; and Commerce and Labor, 1903, which in 1913 was divided into the Department of Commerce and the Department of Labor. With the exception of the Department of Justice and the Postoffice Department, the officers at the heads of the departments are styled Secretaries. The Attorney-General is the head of the Department of Justice, and the Postmaster-General is at the head of the Postoffice Department. These heads of the department, taken collectively, constitute the President's Cabinet. Each of the departments is explained under its title. The heads of departments and other important officers are appointed by the President, with the advice and consent of the Senate, while many minor officers are appointed by the President without consulting the Senate, or by the heads of departments.

The President is commander in chief of the army and navy, has the power to call Congress in special session, when necessary, and can veto any bill passed by Congress, though such a bill may be passed over his veto by a two-thirds vote of the members of each house. It is the President's duty to send a message to Congress at the beginning of each session, setting forth the condition of the country and recommending such legislation as he

believes is necessary. He also has power to grant reprieves and pardons to persons who are sentenced by United States courts, and it is his duty to see that the laws are executed throughout the country and all of its dependencies.

The Judicial Department. The Judicial Department consists of the Supreme Court and such other courts as may from time to time be established by law. At present the United States courts consist of the Supreme Court, nine Circuit Courts of Appeals, 103

missioners appointed by the United States, and the inhabitants were given an active part in the management of government affairs as rapidly as they became competent. Now both of these possessions have their own legislatures. For a detailed statement, the reader is referred to the subhead *Government* in the articles describing each of these possessions. Alaska and Hawaii are organized territories. The Virgin Islands, acquired by purchase from Denmark in 1917, were placed temporarily under a naval governor.



POSSESSIONS OF THE UNITED STATES NOT ON THE AMERICAN CONTINENT

District Courts, a Court of Claims, a Court of Private Land Claims, a Court of Appeals for the District of Columbia, the Supreme Court of the District of Columbia, the territorial courts and admiralty courts. The organization and jurisdiction of these courts are described in the article COURTS.

Outlying Possessions. The acquisition of the Philippine Islands and Porto Rico in 1898 entailed upon the United States a new problem in government. The inhabitants of these islands had never governed themselves, and they were not prepared to assume the responsibilities of government. They were at first governed by a governor-general and com-

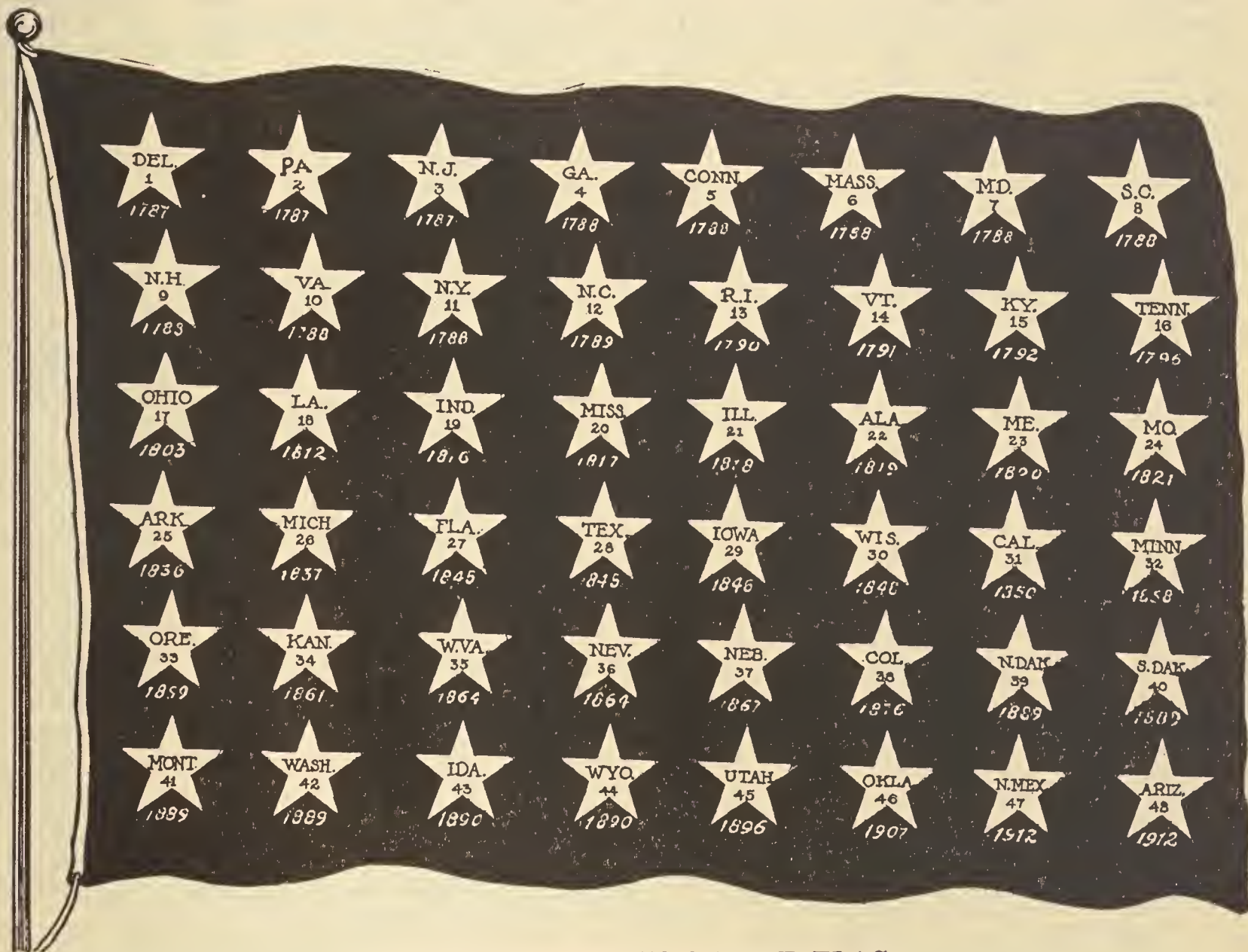
State Governments. The government of each state is based upon a constitution, and in the main follows the plan of the national government. Nearly all states have a legislature of two branches, a Senate and a House of representatives. In many the members of the senate are elected for a longer term than the members of the house, and in some states the terms of only a part of the senators expire at one time, so that one-half of them are chosen at each general election. The executive officers of the state are usually a governor, a lieutenant-governor, a secretary of state, a treasurer, an attorney-general and a superintendent or commissioner

of public instruction. To these some states add an auditor of public accounts and a comptroller.

The state government deals with all affairs pertaining to the interests of the state, such as laws governing marriage and divorce, the obligation of contracts, the settling of estates, the transference of real property and the regulation of loans, interests and mortgages.

In the matter of courts there is a greater divergence of plan. Almost every state has a supreme court, which has a limited original jurisdiction, and to which cases of certain importance may be appealed from the lower courts. Below this are circuit courts, which usually have jurisdiction over several coun-

township officers are chosen at an annual town meeting, in which all voters have a right to participate. All the public business of the local community is in the hands of these town officers. In the county system the township is not recognized, the county being the principal unit of government. The only subdivision is the parish. Under this plan nearly all matters of public interest are looked after by county officers, who are chosen at regular elections. In most states these are known as county commissioners, or county supervisors. Between New England and Virginia a third form of local government grew up. It was the outgrowth of the two systems described above and may be



THE DEVELOPMENT OF THE FLAG

ties, and in some states there are county courts. Almost all the states have county probate courts for the settlement of estates.

Local Government. The early colonists established two forms of local government, the *township* form in New England, and the *county* form in Virginia and other southern colonies. These shaped the local government in most of the original states. Under the former plan the township is the unit, and the

called the *mixed*, or *township-county*, system. Under this scheme certain minor duties devolve upon township officers, while more important local duties rest with county officers. The officers of the county include commissioners, representing the different towns of the county, an auditor, a register of deeds, a treasurer and a superintendent of schools, or school commissioner. Other officers are sometimes added. This system, on the whole,

| STATE | POPULAR NAME | EXTREME LENGTH | EXTREME BREADTH | TOTAL AREA SQUARE MILES | RANK | ADMITTED TO THE UNION | POPULATION CENSUS 1920 |
|-------------------|-----------------------------|----------------|-----------------|-------------------------|------|-----------------------|------------------------|
| Alabama..... | Cotton State..... | 330 | 200 | 51,998 | 28 | 1819 | 2,348,174 |
| Arizona..... | ..... | 390 | 335 | 113,956 | 5 | 1912 | 334,162 |
| Arkansas..... | Bear State..... | 240 | 275 | 53,335 | 26 | 1836 | 1,752,204 |
| California..... | Golden State..... | 770 | 375 | 158,297 | 2 | 1850 | 3,426,861 |
| Colorado..... | Centennial State..... | 270 | 390 | 103,948 | 7 | 1876 | 939,629 |
| Connecticut..... | Nutmeg State..... | 75 | 90 | 4,965 | 46 | * | 1,380,631 |
| Delaware..... | Blue Hen State..... | 110 | 35 | 2,370 | 47 | * | 223,003 |
| Florida..... | Peninsula State..... | 460 | 400 | 58,666 | 21 | 1845 | 968,470 |
| Georgia..... | Empire State of the South.. | 315 | 250 | 59,265 | 20 | * | 2,895,832 |
| Idaho..... | Gem of the Mountains..... | 490 | 305 | 83,888 | 12 | 1890 | 431,866 |
| Illinois..... | Prairie State..... | 380 | 205 | 56,665 | 23 | 1818 | 6,485,280 |
| Indiana..... | Hoosier State..... | 265 | 160 | 36,354 | 37 | 1816 | 2,930,390 |
| Iowa..... | Hawkeye State..... | 210 | 300 | 56,147 | 24 | 1846 | 2,404,021 |
| Kansas..... | Sunflower State..... | 200 | 400 | 82,158 | 13 | 1861 | 1,769,257 |
| Kentucky..... | Blue Grass State..... | 175 | 350 | 40,598 | 36 | 1792 | 2,416,630 |
| Louisiana..... | Creole State..... | 275 | 280 | 48,506 | 30 | 1812 | 1,798,509 |
| Maine..... | Pine Tree State..... | 235 | 205 | 33,040 | 38 | 1820 | 768,014 |
| Maryland..... | Old Line State..... | 120 | 200 | 12,327 | 41 | * | 1,449,661 |
| Massachusetts... | Old Bay State..... | 110 | 190 | 8,266 | 44 | * | 3,852,356 |
| Michigan..... | Wolverine State..... | 400 | 310 | 57,980 | 22 | 1837 | 3,668,412 |
| Minnesota..... | Gopher State..... | 400 | 350 | 84,682 | 11 | 1858 | 2,387,125 |
| Mississippi..... | Bayou State..... | 340 | 180 | 46,865 | 31 | 1817 | 1,790,618 |
| Missouri..... | Bullion State..... | 280 | 300 | 69,420 | 18 | 1821 | 3,404,055 |
| Montana..... | Treasure State..... | 315 | 580 | 146,997 | 3 | 1889 | 548,889 |
| Nebraska..... | Tree-Planter State..... | 205 | 415 | 77,520 | 15 | 1867 | 1,296,372 |
| Nevada..... | Sagebrush State..... | 485 | 315 | 110,690 | 6 | 1864 | 77,407 |
| New Hampshire.. | Granite State..... | 185 | 90 | 9,341 | 43 | * | 443,083 |
| New Jersey..... | Garden State..... | 160 | 70 | 8,224 | 45 | * | 3,155,900 |
| New Mexico..... | ..... | 390 | 350 | 122,634 | 4 | 1912 | 360,350 |
| New York..... | Empire State..... | 310 | 320 | 49,204 | 29 | * | 10,385,227 |
| North Carolina... | Old North State..... | 200 | 520 | 52,426 | 27 | * | 2,559,123 |
| North Dakota... | Flickertail State..... | 210 | 360 | 70,837 | 16 | 1889 | 646,872 |
| Ohio..... | Buckeye State..... | 205 | 230 | 41,040 | 35 | 1803 | 5,759,394 |
| Oklahoma..... | Boomer State..... | 210 | 585 | 70,057 | 17 | 1908 | 2,028,283 |
| Oregon..... | Beaver State..... | 290 | 375 | 96,699 | 9 | 1859 | 783,389 |
| Pennsylvania.... | Keystone State..... | 180 | 300 | 45,126 | 32 | * | 8,720,017 |
| Rhode Island.... | Little Rhody..... | 50 | 35 | 1,248 | 48 | * | 604,397 |
| South Carolina.. | Palmetto State..... | 215 | 235 | 30,989 | 39 | * | 1,683,724 |
| South Dakota.... | Sunshine State..... | 245 | 380 | 77,615 | 14 | 1889 | 636,547 |
| Tennessee..... | Big Bend State..... | 120 | 430 | 42,022 | 34 | 1796 | 2,337,885 |
| Texas..... | Lone Star State..... | 620 | 760 | 265,896 | 1 | 1845 | 4,663,228 |
| Utah..... | Salt Lake State..... | 345 | 275 | 84,990 | 10 | 1896 | 449,396 |
| Vermont..... | Green Mountain State..... | 155 | 90 | 9,564 | 42 | 1791 | 352,428 |
| Virginia..... | Old Dominion..... | 205 | 425 | 42,627 | 33 | * | 2,309,187 |
| Washington..... | Chinook State..... | 230 | 340 | 69,127 | 19 | 1889 | 1,356,621 |
| West Virginia.... | Panhandle State..... | 225 | 200 | 24,170 | 40 | 1863 | 1,463,701 |
| Wisconsin..... | Badger State..... | 300 | 290 | 56,066 | 25 | 1848 | 2,632,067 |
| Wyoming..... | Equality State..... | 275 | 365 | 97,914 | 8 | 1890 | 194,402 |

* Original State.

is more satisfactory than either of the others, and it has influenced the systems of local government in practically all of the western states. It combines sufficient local interest with an economy in management that is not possible under the old township system.

Territories. As the national domain was settled, territorial forms of government were organized to exercise control over such areas as would best meet the needs of the inhabitants. As the territories became more

densely populated they were subdivided, and the subdivisions were in time admitted into the Union and became states. Under a territorial government the governor and territorial judges are appointed by the President with the advice and consent of the Senate; otherwise the territory administers its local affairs, the same as does a state, electing a legislature which enacts laws to meet the needs of its inhabitants. In 1919 Alaska and Hawaii were territories.

Finance. The Constitution gives Congress power to levy and collect direct taxes, duties on imported goods and excise taxes. Direct taxation soon proved to be unpop-

by the government make them very desirable to capitalists.

The most important items of expenditure are pensions, the postoffice, the army, the navy and the interest on the public debt.

Political Divisions. Within the United States proper there are 48 states and 1 federal district. The external possessions consist of the territories of Alaska and Hawaii; Guam, the Philippines, Tutuila, Porto Rico, the Virgin Islands, formerly the Danish West Indies, and a few other small islands. At the adoption of the Constitution there were thirteen organized states, and these are known as the Original States. The first new state admitted was Vermont, in 1791, and the last were New Mexico and Arizona, which came into the Union in 1912. The outlying possessions are described under their titles. The table on page 3696 includes only the states within the United States proper. The figures given are taken from the United States Census of 1920. Arizona and New Mexico, the latest additions to the union of states, elect one Representative each. Each state will be found described under its title.

Territorial Expansion

At the organization of the government, the Mississippi River formed the western boundary of the United States, and the



AMERICA AT THE TIME OF THE REVOLUTION

ular, and except in extreme cases, such as war, rebellion and famine, was rarely adopted until 1913, when an income tax law was passed. Most of the government's revenue, however, until 1920 was derived from import duties and excise taxes on spirituous liquors, tobacco and other articles of manufacture, particularly luxuries. In that year the nation lost its liquor revenues through the prohibition amendment. In 1917 taxes were levied on many articles not ordinarily taxed, because of the expenses incurred on account of the World War.

The income is usually ample for the needs of the government. Loans are occasionally obtained through the sale of bonds. During the World War five such loans were made, aggregating \$19,100,000,000. Four of them were designated as Liberty Loans, and the fifth as the Victory Loan. All were oversubscribed. United States bonds are usually payable after a long period, and while the interest is low, the permanency of the investment and the perfect security offered



UNITED STATES IN 1800

area of the country was 828,000 square miles. Only about 300,000 square miles, or a little over one-third of this area, was actually settled. In 1803 the first great addition of



territory was made by the purchase of Louisiana. Sixteen years later, this was followed by the acquisition of Florida. With these accessions of territory, the country was openly committed to the policy of expanding her domains, so that in the admission of Texas and the taking over of the territory ceded by Mexico no new policy was established, except in the method pursued. Thus far all territory acquired had been adjoining the United States, but in 1867 Secretary Seward, in the purchase of Alaska, took a radical step, in acquiring territory somewhat remote from the country. A still more radical step was taken in the annexation of Hawaii and the acquisition of the Philippine Islands and Porto Rico. In 1917 the Danish West Indies were purchased and renamed the Virgin Islands. Each of these possessions is described under its title.

The following table contains data concerning the territory added to the United States:

| TERRITORIAL DIVISION | YEAR | AREA ADDED (SQ. MI.) | PURCHASE PRICE |
|-----------------------------|------|----------------------------|-------------------|
| Louisiana..... | 1803 | 875,025 | \$15,000,000 |
| Florida..... | 1819 | 70,107 | 5,499,768 |
| Texas..... | 1845 | 389,795 | ..... |
| Oregon Territory..... | 1846 | 288,689 | ..... |
| Mexican Cession..... | 1848 | 523,802 | 18,250,000† |
| Gadsden Purchase..... | 1853 | 36,211 | 10,000,000 |
| Alaska..... | 1867 | 590,884 | 7,200,000 |
| Hawaiian Islands..... | 1897 | 6,449 | ..... |
| Porto Rico..... | 1898 | 3,435 | ..... |
| Guam..... | 1898 | 210 | ..... |
| Philippine Islands..... | 1898 | 114,958 | 20,000,000 |
| Tutuila (Samoa Is.)..... | 1899 | 77 | ..... |
| Additional Philippines..... | 1901 | 68 | 100,000 |
| Panama Canal Strip..... | 1904 | 474 | 10,000,000* |
| Virgin Islands..... | 1917 | 134 | 25,000,000 |
| Total..... | | 2,900,318 | \$102,039,768 |
| Original Territory..... | | 827,844 | |
| Total..... | | 3,900,162 | |

*Besides an annual rental of \$250,000.
†This does not include \$10,000,000 paid to Texas for territory outside of its present boundaries, but included in the state at the time of annexation.

Education

The United States has no national system of education, in the sense that there is an educational system administered by the Federal government. However, from the time of the Ordinance of 1787, in which certain sections of land in the Northwest Territory were reserved for educational purposes, the national government has assisted very materially in public education, by granting generous portions of the public domain for the support of universities, agricultural colleges and public schools, and in 1917 liberal appropriations were granted for vocational education below college grade. In addition

to this it maintains the Bureau of Education, which is a division under the Department of the Interior. The chief officer, called the commissioner of education, collect statistics and publishes a biennial report, containing educational data of national importance. Further than this his duties are advisory only. However, under the able commissioners who have filled the office since the bureau was established, very much has been done to advance the educational interests of the country. The work of the bureau is more fully explained in the article EDUCATION, BUREAU OF.

The administration of the public schools is left to the states, and each maintains its own system of public education. However, these systems so closely resemble one another that, taken together, they practically constitute a national system of education. The articles COMMON SCHOOLS, HIGH SCHOOLS, and those on the important universities of the country will furnish additional information.

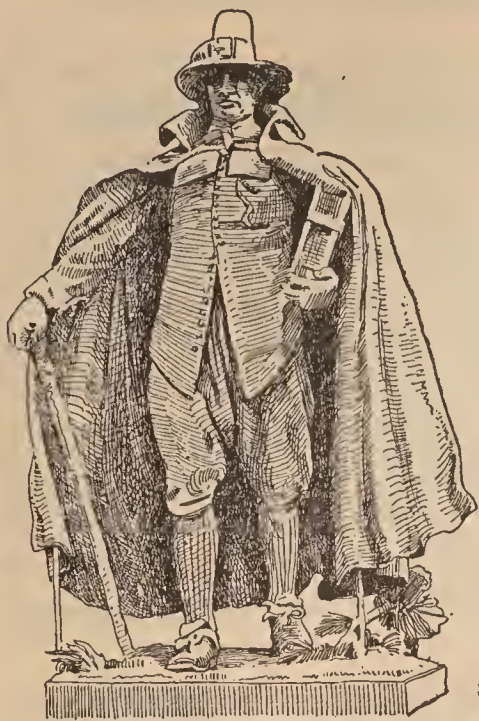
Art and Literature

For information on American art see the articles PAINTING and SCULPTURE. American literature will be found in the article LITERATURE, subhead *American Literature*.

History

Discovery and Exploration. At the time of its discovery by Europeans, America was inhabited by savages belonging to the American, or Red, race. The origin and antiquity of these people and the degree of their civilization are still subjects of investigation and dispute. It is also uncertain at what time and place the American continents were first discovered. Norse seamen are said to have visited the North American coast about A. D. 1000, and it is probable that fishermen from Northern Europe had made voyages across the Atlantic before that date. But even if both these facts were true, the credit for the real discovery of America must still be given to those navigators who, at the close of the fifteenth century, crossed the Atlantic and explored the shores of the "New World."

The first of these navigators was Christopher Columbus, who in 1492 discovered the Bahama Islands and on later voyages explored the South and Central American coasts. John and Sebastian Cabot in 1497 and 1498, under the auspices of England, skirted the coast of Labrador and perhaps



THE PURITAN
St. Gaudens



FOUNTAIN OF THE GREAT LAKES
Taft



COLUMBUS
Bartlett



TWO NATURES
Barnard



MEMORY
French



ETHAN ALLEN
Mead



DEATH AND THE SCULPTOR. French



GEORGE WASHINGTON
Ward

New England, giving Britain the basis for her claim to the continent of North America. About the same time Americus Vesputius was exploring the coasts of South America, and in his honor America was named. In 1513 Balboa, a Spanish adventurer, discovered the Pacific, and in the same year Ponce de Leon discovered and explored Florida. Verrazano was the first to represent France in this new field, his voyage being made in 1524. Frenchmen and Spaniards then vied for the control of the new-found riches. Narvaez, Coronado and De Soto, in the south, set out to conquer for Spain the vast interior of the North American continent, while in the north, Cartier, and in Florida, Ribaut and the Huguenots attempted to establish the power of France, but without success.

Meantime, English enterprise had been dormant, but with the advent of Queen Elizabeth to the throne, in 1558, a group of distinguished mariners became anxious to extend English influence in the New World. Of these, Sir John Hawkins, Sir Francis Drake, Sir Humphrey Gilbert and Sir Walter Raleigh were the most important, but they accomplished little of permanent value. It was not till the opening of the seventeenth century that real progress was made toward subduing and colonizing America. At that time, France, under the leadership of such brilliant men as Champlain, Marquette, Joliet and La Salle, extended her influence throughout the region of Canada and into the Mississippi and Ohio valleys, establishing fur-trading posts throughout this territory. In 1565 Spain established a settlement at Saint Augustine, Florida, and made feeble efforts to extend her authority northward, but with little success.

Colonization. A detailed account of the development of each of the colonies, is given in articles upon the several states and also upon the leading discoveries and explorers of the period.

English Colonies. The chief fact in American history during the seventeenth century is the settlement of English colonies along the Atlantic coast. This was begun in 1607 at Jamestown, Virginia, under the auspices of the London Company, a trading and colonizing corporation similar to the East India Company. This colony was in large measure a commercial and political enterprise, and its settlers were drawn from all classes, but especially from the wealthy

and the adventurous. During its early life Jamestown witnessed some of the most important episodes of American history, among them the establishment of the first representative assembly in America (1619), and the institution of negro slavery (1619).

The second English settlement was at Plymouth, Massachusetts, in 1620, and was made by men who had fled from England to avoid religious persecution. In 1628 a settlement was made at Salem by English Puritans. This, too, was a religious movement. The early history of Plymouth and Salem, the latter called Massachusetts Bay Colony, was somewhat troubled. The colonists early manifested a desire for self-government, which led to bitter contests with the king, but at the same time brought about important progress toward political and religious liberty. However, in 1636 Roger Williams was exiled for his religious belief, and in 1651 a bitter persecution of the Quakers began in Boston. Meantime, Harvard College had been founded in 1638, and the first printing press had been set up in 1639.

The success of the early colonies led to other enterprises, and settlements in New Hampshire and Maine resulted. But even the freedom which was nominally established in Massachusetts did not satisfy that community, and in 1633 bodies of settlers from the coast began to travel inland and found settlements along the Connecticut River. These developed into the Colony of Connecticut, which in 1637 adopted the first written constitution in America, known as the "Fundamental Orders of Connecticut." New Haven was settled in this year and was united with Connecticut in 1682. Maryland was organized as a proprietary colony, under the Lords Baltimore, and its first settlement was at Saint Mary's, the original purpose being to found a haven of refuge for English Catholics. The territory of the Carolinas was first settled by Virginians, but in 1663 it was granted to eight English noblemen, who divided it into two colonies, which were again united in 1699, but governed separately after 1729.

Pennsylvania was a Quaker proprietary colony, founded by William Penn, Jr., in 1676 and colonized six years later. Its government was organized on an extremely liberal basis and exerted a powerful influence upon other American colonies. The settlement of Rhode Island was the outgrowth of

the religious persecution in Massachusetts, being founded by two exiles, Roger Williams and Anne Hutchinson, the former settling at Providence, the latter at Portsmouth.

They eventually united their forces. Georgia was the last of the thirteen colonies to be settled; it was founded by James Oglethorpe in 1732, as a refuge for honest debtors. A village was settled at Savannah in the following year.

Other Colonies. New Jersey was first colonized by the Dutch at Fort Nassau, now Gloucester. This was subsequently conquered by the Swedes, restored to the Dutch in 1655 and finally transferred to the English in 1664, becoming a proprietary province under Lord Berkeley and Sir George Carteret. The Dutch were also the first to establish colonies within the territory of New York, by reason of the voyage of Henry Hudson in 1609. Albany was settled in 1623, and New Amsterdam (New York), the same year. The colony was conquered by the English in 1664. Delaware was long a fighting ground between the Dutch and the Swedes, the latter finally being compelled to relinquish their claim; but the English conquered in 1664.

Colonial Development. During the seventeenth century the scattering colonies of all the nations steadily advanced in strength and constantly extended their borders, until the Atlantic coast from Labrador to Mexico was dotted with prosperous villages and trading centers. During the first half of the eighteenth century, the interests of France and England began to come into conflict, as each attempted to extend its dominion over the fertile interior of the continent. This resulted in a series of wars, known, collectively, as the French and Indian wars, extending with but slight interruptions from 1689 to 1763. This long conflict had three great results from the standpoint of the colonies: (1) It practically drove France from America and decided that American Institutions should be organized chiefly upon British models; (2) it gave the colonists military experience and a feeling of independent power, which made them more willing to stand firmly for their rights against the mother country; (3) it disclosed the necessity for intercolonial union.

During this same time the colonies were developing politically and were manifesting more and more clearly their determination to govern themselves, at least in all local affairs.

The Development of Union. From the earliest times events in America had shaped themselves to the end that the colonies should become not independent units, but parts of a general system. By the middle of the eighteenth century the necessity of such a result had become more evident, only because in the meantime minor issues of a local nature had been decided, and because recent events, in which all the colonies were united, had disclosed to the colonists their common interests and ideals. This development of the spirit of union culminated in 1754 in a congress, held at Albany for the purpose of framing a treaty of friendship with the Indians, and also of devising a plan for the union of all the colonies. The latter plan, prepared by Franklin, was adopted by the convention, but it was rejected by every colony and by the mother country. The reasons for its rejection disclosed a state of affairs which found its natural conclusion in the Revolutionary War. Says Franklin, "The Assembly did not adopt it, as they all thought there was too much *prerogative* in it, and in England, it was judged to have too much of the *democratic*." Thus the issue was clearly drawn between England and the colonies; the former was set resolutely against the growing spirit of independence and democracy in America; the latter were determined to prevent interference in their affairs.

Revolutionary War. Causes and Beginnings. The fundamental cause of the Revolutionary War had both economic and political phases. It was laid in the theory of colonization held by every important country in the world at that time, namely, that colonies existed for the mother country and that they had no political or commercial rights except those specifically granted to them. This principle probably would not have been contested, if the tendency of all governments, and especially of England, had not been to repress the growing strength of their colonies and thus to cause distressing economic conditions, which the colonists themselves had no power to remedy.

This led to the demand for political self-government, which, when refused, roused a spirit of resistance and, finally, of revolution. This end was hastened by the passage of more and more repressive legislation, such as the enlargement of the Navigation Acts (which see), the establishment of British garrisons in America and the taxation of the colonies to

support these garrisons. To enforce the second policy, a stamp tax was inaugurated, which gave to every colonist a grievance and awakened the famous cry, "Taxation without representation is tyranny." The act repealing the Stamp Act was accompanied by a declaration that the Crown had the right to tax the Colonies, and thus it was of little benefit in appeasing the wrath of the Americans. When followed by the Townshend Acts the situation became serious and culminated in open violence in Boston, during which British soldiers in Boston killed a number of citizens.

It soon became evident to the leading men in the colonies that little was to be expected in the direction of conciliation, and an effort was made to unite the colonies more firmly in opposition to the mother country. One of the important means to this end was the formation of committees of correspondence, which kept the different colonies informed of the march of events throughout the country. The spirit of defiance became more widespread, as was indicated by the destruction of the *Gaspee*, a British man-of-war, stationed near Rhode Island to prevent violation of the customs laws, and by the Boston Tea Party. To punish this lawlessness, the British government passed, and attempted to enforce, laws clearly violating the English constitution, and striking at rights especially dear to the colonists. Among these were the Boston Port Bill, closing the port of Boston to all commerce, and acts allowing the trial in England of certain official offenders, permitting the quartering of soldiers upon the colonies and abolishing certain provisions of their charters. To enforce these laws, General Gage and a force of soldiers were sent to Massachusetts.

The colonies were thoroughly aroused, and in reply to a request of the Massachusetts assembly, they sent delegates to a congress at Philadelphia, September 1, 1774. This body, known as the First Continental Congress, passed resolutions of protest against the British policy and agreed not to import goods from England, then adjourned, to reassemble May 1, 1775. Their petition to Parliament was answered by still more oppressive acts; and before the second Congress met, the American cause had gone beyond the stage of discussion or compromise. The colonies, led by Massachusetts, collected military forces and supplies, and when Gen-

eral Gage attempted to seize the stores at Lexington and Concord, and to arrest Samuel Adams and John Hancock, his force was met by a body of minutemen, drawn up on Lexington Common. In the battle which followed the first blood in the Revolutionary War was shed. The government of the colonies was soon taken over by the patriots and, guided and inspired by the Second Continental Congress, measures of increasing defiance and independence were taken from time to time. (See articles upon the REVOLUTIONARY WAR IN AMERICA and the decisive battles, for brief outlines of the chief military campaigns; see also articles upon the great statesmen and soldiers of the period.)

Results of the War. At the opening of the struggle the people of the country were not united in the conviction that political independence of Great Britain was the end to be desired. They were still loyal to the mother country and were determined to fight to regain their rights as Englishmen. But the passage of events and the necessary assumption of the ordinary functions of government by Congress and the provisional governments of the colonies, brought the question of independence prominently forward and finally caused independence to be proclaimed. Meanwhile, foreign relations had been established by the appointment of a committee to correspond with foreign governments, and this resulted, in February, 1778, in the signing of a treaty of alliance with France. This treaty is generally considered the turning-point of the war, since it led to such active support by France that England was eventually compelled to make peace, the treaty being signed at Paris, September 3, 1783.

Articles of Confederation. The financial and internal affairs of the colonies were in a far from satisfactory state. The Continental Congress had assumed only the absolutely necessary functions and had no legal power to compel obedience to its decrees. Appreciating the importance of forming a stronger government to replace that which was being destroyed by the Revolution, Congress appointed a committee in the summer of 1776, to draw up articles for the confederation of the thirteen colonies. These articles, though a vast improvement over the organization which had previously existed, left much to be desired, since the same spirit

MASSACHUSETTS



PLYMOUTH ROCK

*What sought they thus afar?
Bright jewels of the mine!
The wealth of seas? the spoils of war?
They sought a faith's pure shrine.*

Outline.

Time - Dec. 21, 1620.

Place - Plymouth.

Why so named?

People - Pilgrims

Leaders - Bradford - Brewster

Character - Industrious

Wanderings.

Number - 102.

No. of families - 19.

Suffering.

Object - Religious freedom.

Site - Mayflower

No. of houses - 20.

Governor - Carver - Bradford.

First Thanksgiving.

Growth - Very slow

Independence



ELM TREE



SALEM WITCHCRAFT

Time - 1692.

Place - Salem, Mass.

Causes

Religious fervor of the Puritans.

Belief in the power to do 'evil bidding'.

Events

Puritans filled.

Thirty-five tortured into confusion!

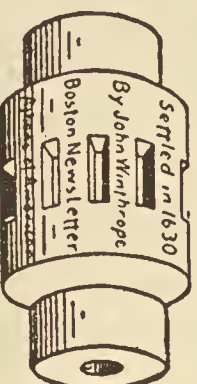
Twenty-two to death.

Results

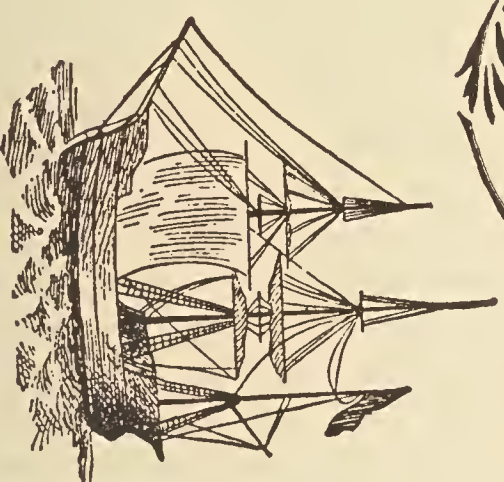
Showed the superstition of the time.

Deceived the spirit of intolerance.

BOSTON



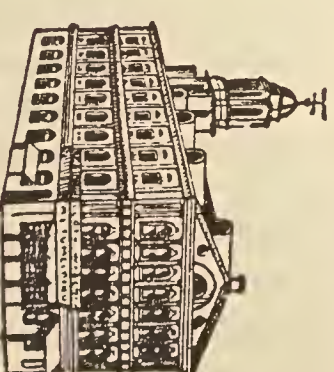
HUB OF THE UNIVERSE



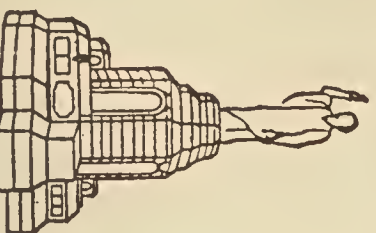
MAY-FLOWER



PINE TREE SHILLING



FANEUIL HALL
"CRADLE OF LIBERTY"



PILGRIM MONUMENT

which had led the colonists to resist the encroachments of British power led them to fear the establishment of a strong power among themselves. The articles therefore provided for no executive head of the government, leaving all power with Congress, which could pass laws only with the consent of the representatives of nine states, a majority of the representatives of each state being necessary to cast its vote.

In spite of the apparent weakness of the government which was thus created, state jealousies prevented the adoption of the articles until almost the close of the war, in 1781. Meantime, the financial affairs of the government as a whole and of the several colonies had come to a serious state, since all the governments had been compelled to borrow vast sums of money and, besides, had issued paper notes in payment of debts. This paper money, coming from many sources without adequate security, rapidly depreciated in value, until at the close of the war it was practically worthless. The department of war was in a similarly disorganized state.

Adoption of the Constitution. Soon after the adoption of the Articles of Confederation a large faction in the states demanded that a stronger government be immediately organized, but it was several years before they were able to win public sentiment to their view. Finally, in 1786, a convention was proposed by several states, for the purpose of amending the Articles, in order to increase the power of the central government. This convention met in May, 1787, at Philadelphia, and contained in its membership the most able and distinguished statesmen in America, including George Washington, Alexander Hamilton, James Madison, Gouverneur Morris, Robert Morris, Roger Sherman and others. Its sessions were turbulent, owing to the presence of a strong minority party, who feared the centralization of authority, and it was only through compromise that the Constitution was finally produced and accepted. In its completed form it did not satisfy either party, and the discussion which had taken place in the convention was carried before the people in the contest for ratification. Through the efforts of Jay, Hamilton, Madison, Henry Lee, George Washington and others, it was finally adopted, however, being recognized as the most satisfactory constitution which could at that time be made.

Before its final adjournment, the old Congress of the Confederation performed its most notable work, in passing the famous Ordinance of 1787, for the government of the Northwest Territory.

Organization of the National Government. After the ratification of the Constitution by nine states, Congress proceeded to plan for the organization of the new government. The election, held in January, 1789, resulted in the unanimous choice of George Washington for President; John Adams, having the next highest number of votes, was made Vice-President. The inauguration of the government was delayed until April 30, 1789. Washington took the oath of office at New York, where the first national Congress was assembled.

This body already showed a tendency toward division. The Federalists, that is, those who had advocated the ratification of the Constitution, were opposed by the old Anti-Federalists, now styling themselves Democratic-Republicans, or Republicans, who desired the strict interpretation of the Constitution and a tendency toward decentralization of power. Washington chose for his advisers representatives of both of these factions, Hamilton being the acknowledged leader of the former, and Jefferson, of the latter. Hamilton became Secretary of the Treasury, and the first important action of the new government was the carrying into effect of principles suggested by him for the management of the finances of the country. These included the inauguration of the tariff duties; the establishment of a national bank; the assumption of debts contracted by the states during the Revolution; the institution of the excise tax; the establishment of a national mint, and a system of coinage. All of these measures aroused the greatest opposition, but all were passed, and all soon proved their value and efficacy. Washington set himself to organize the executive departments of the government, and he established precedents which have ever since been followed. During his first term, also, the judicial system was organized, and the first ten amendments to the Federal Constitution were adopted.

In spite of his opposition, Washington was nominated and reelected unanimously in 1793. Adams was also reelected Vice-President, but was opposed by George Clinton of New York, a Republican. The most important matter connected with Washington's

second administration was the relation of the government to foreign nations, especially England and France. The Federalists sympathized with England, and the Republicans sympathized with France, in the war which had begun between them. The visit of Citizen Genet, Washington's refusal to recognize him and the later proclamation of neutrality, together with the signing of the very unsatisfactory treaty with England, known as the Jay Treaty, and the refusal of England to evacuate its posts in the Northwest Territory or to grant privileges to American commerce, all led to serious domestic disturbances and almost to war; but such an event was averted by Washington's tact and frankness. His second administration was also important for the suppression of the first rebellion against the government, the Whisky Insurrection in Pennsylvania; for the unsuccessful expedition of Saint Clair against the Indians and the successful expedition of General Wayne, resulting in the cession of a large tract of land by the Indians to the United States. A treaty was negotiated with Spain, by which the United States secured the free navigation of the Mississippi. In 1793 Eli Whitney invented the cotton gin, which was to be of greater political importance during the next century than any other single invention of history.

Washington positively refused to accept a third term as President, delivered a famous farewell address and retired to Mount Vernon. He was succeeded by John Adams, a Federalist, who received 71 votes, in opposition to Thomas Jefferson, a Republican, who received but 68. Adams' administration was at first highly popular, on account of the firm stand which it took against the insolent actions of France, but the passage in 1798 of the Alien and Sedition acts not only forfeited the popularity of the party, but led to its overthrow. The famous Kentucky and Virginia resolutions were passed at this time in relation to these laws. The seat of government was changed in 1800 from Philadelphia to Washington. Doubtless the most important appointment of Adams' administration was that of John Marshall to be Chief Justice of the United States Supreme Court.

At the election in 1800, Adams was defeated, but the two Republican candidates, Jefferson and Burr, had an equal number of electoral votes. The House of Representatives elected Jefferson after a long contest.

Supremacy of the Anti-Federalists. The ascendancy of the Anti-Federalists marks an important change in American politics. At the close of the Revolutionary War there was a notable reaction from the extreme ideas of liberty which that struggle had expressed, and the Constitution placed far more power in the central government than pleased many of the more radical Democrats in the country. But after Adams' administration, another reaction set in, away from centralization, toward democracy. In spite of his theories of strict construction, Jefferson soon was compelled to take steps involving broader powers than either of his Federalist predecessors had assumed. First was the purchase of Louisiana in 1803, the constitutionality of which even he himself doubted. On the other hand, he attempted to reduce the importance of the national government by making but small appropriations for the army and navy; but he was compelled to abandon even this policy when a war with the Barbary powers broke out in 1801. During his first term the Twelfth Amendment to the Constitution was passed, changing the method of voting for President and Vice-President.

Jefferson was reëlected in 1804, with George Clinton of New York as Vice-President. The most important problem which confronted him during his second administration was the relation of the United States to the commercial war between France and England. He attempted to establish in law his theory that the United States could compel Europe to consider its rights by shutting American ports to the commerce of European nations. This was the cause of the Embargo Act of December, 1807, forbidding American vessels to leave for foreign ports (see EMBARGO). However, this measure did not accomplish its intended purpose, but instead it seriously injured American commerce. The relations between the United States and Great Britain became more and more strained, because of the persistent attempts of British vessels to impress seamen from American ships. This resulted in several small battles. During Jefferson's administration, also, Aaron Burr attempted to separate the western states from the Union; Lewis and Clark made their famous expedition to the Pacific coast (see LEWIS AND CLARK EXPEDITION); the Cumberland Road was authorized and begun; West Point Military Academy was established; Fulton succeeded in constructing the

first successful steamboat, and the slave trade was abolished after 1808.

Jefferson declined a third election and was succeeded by his Secretary of State, James Madison, who defeated Charles C. Pinckney. The Embargo Act was replaced by the Non-Intercourse Act, before Madison's inauguration, but this did not relieve matters greatly. Madison attempted to carry out Jefferson's policy, but was finally compelled to take more stern measures, and the War of 1812 resulted. Meantime, Madison was reëlected, with Elbridge Gerry as Vice-President, defeating De Witt Clinton. The war was vigorously opposed by the Federalists, especially of New England, and they held a convention at Hartford, in December, 1814, which, it was rumored, threatened secession; but this movement did not gain sufficient strength to be a serious menace to the country. The treaty of peace was signed at Ghent, December 24, 1814.

The end of the war marked, also, the practical end of the Federalist party as an organization, for its unpatriotic stand during the war had won for it the derision of people in all parts of the country. However, the Anti-Federalist party had meantime so changed its position upon constitutional questions that many of the Federalist principles were already firmly incorporated in the government. During Madison's term, laws were passed granting a second charter to the United States Bank, establishing a protective tariff and appropriating large sums for internal improvements, all measures which the Anti-Federalists had formerly opposed. The Supreme Court, under Marshall's leadership, had also taken firm ground in favor of a strong national government.

The Era of Good Feeling. In 1816 James Monroe of Virginia, Madison's Secretary of State, was elected President, receiving the votes of all the states except Massachusetts, Connecticut and Delaware, which were cast for Rufus King of New York. Since the downfall of the Federalist party had removed many questions from controversy, Monroe's administrations are sometimes known as the "Era of Good Feeling;" but, in fact, just as sincere debate was carried on during this time as at any time before or after, the main questions being the tariff and the admission of Missouri, the latter of which involved the discussion of the rising issue of slavery. Monroe was reëlected in 1820, receiving all the elec-

toral votes but one, which was cast for John Quincy Adams. The most important incident of his second administration was the promulgation of the Monroe Doctrine. In 1824 a higher protective tariff was passed. The election of 1824 turned upon personal questions and resulted in a contest between Andrew Jackson, John Quincy Adams, William H. Crawford and Henry Clay, the House of Representatives finally electing John Quincy Adams.

Rise of the Whigs. This election marks another change in the political history of the United States. The Republican, or Democratic-Republican, party at this time took the name of Democratic, which it has since retained, and the Clay and Adams factions, consisting of the loose constructionists of the old party, took the name of National Republican, which eventually was changed to Whig. Adams' administration was marked by a long controversy between his followers and those of Jackson, who claimed that they had been deprived of the election by a corrupt compact between Adams and Clay. This helped to defeat the Adams faction in 1828 and to elect Jackson. The most important event of this period was the passage of the Tariff of Abominations of 1828, which led to the nullification controversy in the following administration. Adams' term also saw the extension of the policy of internal improvements at the expense of the national government, and the beginning of a vast immigration into the West.

Democracy Again in Power. Jackson was elected in 1828 by a vote of 178 to 83, with John C. Calhoun as Vice-President. This election marks the return of the radical Democratic party to power. The chief contests of Jackson's term were over the United States Bank and the tariff, the former being refused a continuance of its charter and the latter resulting in the nullification episode, which was firmly handled by President Jackson, secession being prevented by a compromise bill introduced by Henry Clay. During this controversy the famous debate between Daniel Webster and Robert Y. Hayne occurred. Jackson was reëlected in 1832 over Henry Clay, John Floyd and William Wirt, and Martin Van Buren was chosen Vice-President. His second administration was marked by Indian disturbances, in the South with the Cherokee and Seminole, and in the West with the Sacs and Foxes under Black Hawk.

The Senate took firm ground against the President, especially for his attitude toward the national bank, and this contest was bitter throughout his term. The question of the independence or annexation of Texas also arose during Jackson's second term and signaled the increasing importance of the slavery controversy, the Texas question resolving itself into a contest upon the part of the South for the extension of slavery territory, and resistance to this policy by the North. The first anti-slavery societies date from this time. President Jackson's terms were also notable for the first important contest over the spoils system, which he had introduced into the national government.

Jackson was succeeded by his follower, Martin Van Buren, who defeated the Whig candidate, William Henry Harrison of Indiana. Richard M. Johnson was elected Vice-President. The first year of Van Buren's term was marked by a terrible financial panic, which caused the failure of many banks and corporations and produced great suffering among the people. Van Buren continued the hostility of the Democratic party to the establishment of a national bank and replaced that institution by a system known as the independent treasury. Van Buren's plan, with modifications, has continued to the present.

A Whig Triumph. The financial depression and other issues led to the election of the popular Whig candidate, William Henry Harrison, in 1840, after a memorable campaign, known to history as the "log cabin and hard cider campaign." The anti-slavery party at this election for the first time nominated independent candidates, James G. Birney being the candidate of the Liberty party. Harrison died shortly after his inauguration, and was succeeded by John Tyler, formerly a Democrat. He immediately came into conflict with Congress over the proposed reestablishment of the national bank, and he vetoed two bills drawn to that end. The controversy became so heated that all of Tyler's Cabinet except Webster resigned, he remaining merely to complete the negotiation of the famous Webster-Ashburton Treaty, which fixed the northeastern boundary between the United States and Canada.

In 1843 President Tyler arranged a treaty with the Republic of Texas, providing for the future annexation of that country to the United States, but it was rejected by the Senate. The Texas question became the

leading issue in the following campaign, however, which resulted in the election of James K. Polk, the Democratic candidate, over Henry Clay, the Whig, and James G. Birney, the candidate of the Liberty party. Before Tyler left office Congress had approved a resolution for the annexation of Texas.

Texas and the Mexican War. The administration of President Polk was chiefly notable for the precipitation of the Mexican War, as a result of his order to the United States troops under General Taylor to take possession of territory claimed by both Texas and Mexico. Texas was admitted as a state in June, 1845. The war resulted in an easy victory for the United States and by the treaty of Guadalupe Hidalgo the United States territory was greatly extended. The war is described in the article MEXICAN WAR.

The dispute over the territory of Oregon was also an issue in the campaign in 1844 and was settled by a treaty with England in 1846. During Polk's administration, the Walker tariff of 1846 was passed; it was a return to the principle of tariff for revenue only. The independent treasury was also firmly established. The slavery question again cropped out over the extension of the institution to the territory acquired from Mexico and in the formation of the Free-Soil party. Gold was discovered in California in 1848 and resulted in a vast immigration to that region.

The Liberty party had been fused with the Free-Soil party, and in 1848 it nominated Martin Van Buren as its candidate for President, against Lewis Cass, the Democratic nominee, and General Zachary Taylor, the Whig nominee. Taylor was elected, with Millard Fillmore as Vice-President.

Downfall of the Whigs. In spite of its triumph at this election, the Whig party soon showed signs of disintegration, being absorbed in part by the Free-Soil movement, which later took form in the Republican party. Meantime, the Democratic party came under the control of its pro-slavery faction, and the slavery issue was therefore brought to a crisis. For a time in 1850 the controversy seemed to be allayed through the compromise measures, which admitted California as a free state, but gave the South numerous concessions, in the form of the Fugitive Slave Law and the organization of New Mexico and Utah with the right to admit or prohibit slavery as they chose.

President Taylor died before the passage of these acts, and Millard Fillmore succeeded to the Presidency. The most important event of his administration was the signing of the Clayton-Bulwer Treaty, regarding the inter-oceanic canal. In the election of 1852 the Democrats were successful, Franklin Pierce of New Hampshire becoming President, and William R. King of Alabama, Vice-President. The Whig nominees were General Winfield Scott and William A. Graham. The Free-Soil party nominated John P. Hale of New Hampshire and George W. Julian.

Slavery. In spite of the apparent cessation of the slavery controversy, the struggle soon revived over the organization of the territories of Kansas and Nebraska, and the doctrine proposed by Stephen A. Douglas for the regulation of these territories, known as "squatter sovereignty" (which see). This contest marked the final dissolution of the Whig party, most of the Southern members joining with the Democrats in favor of the extension of slavery, the Northerners, together with other anti-slavery factions, uniting to form the Republican party. During this time a fierce struggle for the possession of Kansas ensued between the anti-slavery and pro-slavery factions (see KANSAS, sub-head *History*). It was during Pierce's administration that Commodore Perry negotiated his treaty with Japan.

The election of 1856 again resulted in a Democratic success, James Buchanan being elected President and John C. Breckinridge Vice-President, over John C. Fremont and William L. Dayton, the Republican candidates, and Millard Fillmore and A. J. Donelson, the nominees of a new party, known as the Know-Nothings or American party. It was during Buchanan's administration that the slavery struggle came to a head. It witnessed the Supreme Court decision in the Dred Scott case, declaring that Congress had no right to prohibit slavery in the territories; the attempts upon the part of Southern statesmen to gain possession of Cuba, for the extension of slavery, and the continuation of the bitter struggle in Kansas, which resulted, in the succeeding administration, in the admission of Kansas as a free state. In 1859 occurred John Brown's raid at Harper's Ferry, which roused the most bitter antagonism in the South. The Democratic party was now practically divided, and two sets of candidates were nominated, one by the North-

ern wing and the other by the Southern wing. The former was Stephen A. Douglas, of Illinois, and Herschel V. Johnson, of Georgia; the latter, John C. Breckinridge, of Kentucky, and Joseph Lane, of Oregon. The Republicans nominated Abraham Lincoln, of Illinois, and Hannibal Hamlin, of Maine, while a third party, the successor of the American party, now known as the Constitutional Union party, nominated John Bell, of Tennessee, and Edward Everett, of Massachusetts. Lincoln was elected by a comparatively small plurality and by far less than a majority of the popular vote.

Secession. The election of Lincoln was the signal for the South to take measures to overcome the overwhelming opposition to them in the United States government, and it resulted in the secession of South Carolina on December 20, 1860. Mississippi, Florida, Alabama, Georgia, Louisiana, Texas, Virginia, Arkansas, North Carolina and Tennessee followed within the next six months, and a new nation, known as the Confederate States of America, was organized at Montgomery, Ala., in February, 1861. President Buchanan opposed secession, but denied his right to coerce the seceding states to return to the Union, and therefore he made little effort to protect government property in the South, which was being taken over as rapidly as possible by the seceding states. Efforts at compromise were made during Buchanan's administration, but without effect. A resolution introduced into the Senate by Senator Crittenden proposed to divide the Union into a slave country and a free country.

Civil War. In his inaugural address President Lincoln urged all sections and classes to come to the support of the government, but expressed his determination to prevent secession. Accordingly, he soon called for volunteers. The Confederate government also called for volunteers and retaliated for Lincoln's proclamation of a blockade by licensing privateers to prey upon Northern commerce. The war began with the bombardment of Fort Sumter on April 14, and its surrender. In April, 1862, Congress purchased and emancipated all slaves in the District of Columbia; two months later it abolished slavery throughout the territories and the public domain, and on January 1, 1863, President Lincoln issued his famous Emancipation Proclamation, which he had announced in the previous September, after the Battle of An-

tietam. This proclamation set free all the slaves in states then in rebellion against the United States.

During the war the President did not have the undivided support of the North. His suspension of the writ of habeas corpus, the suppression of newspapers and of public gatherings, the Conscription Act of 1863 and the apparent failure of the Union armies in the field during the early years of the war, all led to serious opposition and criticism. The financial problems of the war also necessitated taxes and other extraordinary measures, which became exceedingly unpopular. However in the election of 1864 the Democratic party, in spite of the nomination of a popular general, George B. McClellan, was defeated, on a platform which declared that the war was a failure, and Lincoln was triumphantly reëlected. West Virginia, which had been separated from the old State of Virginia, soon after the beginning of the struggle, was admitted to the Union in December, 1862. The war practically came to a close on the surrender of General Lee in April, 1865, but the rejoicing which that event caused was soon overshadowed by universal sorrow at the assassination of President Lincoln, April 14. For a full account of the war, see the article CIVIL WAR IN AMERICA. See, also, articles on the important battles and the leading statesmen and military leaders of the period.

Reconstruction. The problems which the close of the war would bring were anticipated by Lincoln and by Congress, and steps were taken as early as 1863 to provide for the return of the seceded states to the Union and the reëstablishment of loyal state governments. President Johnson, who acceded to the presidency at the death of Lincoln, carried out as far as possible his predecessor's lenient policy of reconstruction, but in so doing he won the enmity of Congress and was impeached, being saved from conviction by a single vote. Meantime, Congress had passed the Thirteenth Amendment, abolishing slavery, and it had been ratified in December, 1865. It had also passed other laws, placing the Southern states in the position of conquered provinces. In 1868, Arkansas, Alabama, Florida, North and South Carolina, Georgia and Louisiana were readmitted to the Union.

The election of 1868 placed General U. S. Grant in the President's chair, with Schuyler

Colfax of Indiana, as Vice-President. The Democratic candidates were Horatio Seymour of New York, and Francis P. Blair, Jr., of Missouri. Before Grant's inauguration, the Fourteenth and Fifteenth Amendments to the Constitution had been passed, granting suffrage to the negroes. The latter was ratified in March, 1870.

The most important event of Grant's first term was the settlement of the Alabama claims, which were claims of the United States against England for American ships destroyed by the *Alabama*, a Confederate privateer that was fitted out in England. The award was favorable to the United States. The Union Pacific Railroad was completed, giving the country its first transcontinental railway, but the construction was accompanied by a stock deal which involved several members of Congress and the Vice-President in a notorious scandal, fully described in the article CREDIT MOBILIER OF AMERICA.

The reconstruction policy of Congress led to serious difficulties in the South, which the President sought to remove, but with only partial success. Irresponsible demagogues from the North secured appointment to offices in the South, and were thus placed in positions which they were nowise qualified to fill. Their chief aim seemed to be to reap all possible benefit for themselves and then to leave the country when they could no longer hold office. They were styled *carpetbaggers*, because it was alleged that they could carry all their personal effects in a carpetbag.

This carpetbag régime and other abuses led to the formation of a secret organization among the men of the South, known as the *Ku-Klux Klan*, whose chief purpose was to resist the carpetbaggers and to prevent the execution of their orders. A fuller account of these events will be found in the articles RECONSTRUCTION and IMPEACHMENT, and in the articles on the various Southern states under the subhead *History*.

The Credit Mobilier scandal led to a demand for a reform in the civil service, which was made an important issue in the succeeding campaign. This issue, with that of reconstruction and the tendency of the Republicans to centralize power, led to the formation of a new party, the Liberal Republican party, whose candidates, Horace Greeley and B. Gratz Brown, were endorsed by the Democratic convention. However, General Grant

was reëlected, with Henry Wilson of Massachusetts as Vice-President, Greeley having died before the count of the electoral votes. In the same election the Prohibition party and a labor reform party first appeared.

Grant's second term was troublesome. Soon after his reëlection he was confronted by a difficulty with Spain. A Spanish warship seized the American merchantman *Virginius*, which was carrying munitions and other supplies to the rebels in Cuba. Four Cubans who were on the vessel, the captain and thirty-six of the crew, were executed by orders of the Spanish authorities. The affair came near leading the country into war with Spain, but it was finally settled by diplomacy. Another difficulty was caused by the alliance of several Federal revenue collectors with distillers for the purpose of defrauding the government of the excise tax on whisky. This *Whisky Ring*, as the combination was called, had influential friends in the Treasury Department at Washington, and it was a long time before the loss of revenue could be located. The "ring" was finally exposed, the officials implicated were dismissed from office and the distillers were prosecuted and convicted, but most of the prominent ones were pardoned. There was a controversy over the resumption of specie payments and a disastrous financial panic in 1873. Indian troubles culminated in a war with the Modocs and Sioux, during which General Custer and his entire force were massacred.

In 1876 the Centennial Exposition was held in Philadelphia to commemorate the first century of the nation's independence. It was the first great international exposition held in America, and all the leading nations of the world were represented.

Industrial and Economic Progress. Discontent with Grant's administration increased. The Democrats gained a majority in Congress and made a hard fight for the election of 1876. Their candidate, Samuel J. Tilden, received a majority of the popular vote, but was defeated by one electoral vote, as a result of an investigation by a specially constituted electoral commission, which considered the disputed returns from several states. The successful candidate, President Hayes, immediately withdrew United States troops from the South and thus paved the way for a return of good feeling between the two sections. His term was also notable for the rise of a party representing the laboring

classes, which demanded a bimetallic standard of money, the suppression of national bank notes, the institution of an income tax and the prohibition of Chinese immigration. This party became known as the Greenback party. In 1878 the Bland-Allison Bill, which required the government to purchase not less than \$2,000,000 nor more than \$4,000,000 of silver per month, was passed, and in the following year specie payments were resumed. In 1880 within the Republican party arose a fierce contest for control between the followers of Ulysses S. Grant who demanded for him a third term, and those of James G. Blaine and John Sherman. James A. Garfield, of Ohio, a compromise candidate, was finally chosen, however, and was victorious over General Winfield S. Hancock, the Democratic nominee, and James B. Weaver, the Greenback-Labor candidate.

The early part of Garfield's administration was marked by the continuation of the party contest and by the disclosure of frauds in the postal service. President Garfield was assassinated in July, 1881, and died in the following September, Chester A. Arthur becoming President. During his administration the Edmunds law against polygamy was passed; also a bill suspending Chinese immigration for ten years. Civil service reform was forced to the front by the Democratic party, and in 1884 their nominee, Grover Cleveland, of New York, was elected over James G. Blaine by a small popular plurality. The election disclosed an independent movement in the Republican party, which was led by some of the most prominent Republicans in the country. Benjamin F. Butler, of Massachusetts, was the candidate of the Greenback-Labor party, and John P. Saint John was the candidate of the Prohibition party.

President Cleveland proceeded to extend the civil-service reform to a vast number of offices, thus securing the antagonism of many of the political leaders in his own party. The death of Vice-President Hendricks made necessary the passage of a law governing the Presidential succession. During the same administration a new anti-polygamy law, the Interstate Commerce Act of 1887 and a law prohibiting Chinese immigration, were passed. The administration was characterized by an unprecedented use of the veto power, especially upon private pension bills. The campaign of 1888 turned upon the tariff,

which President Cleveland had brought forward as an issue by a late message in December, 1887. Cleveland was nominated by the Democrats in that year, but was defeated by the Republican candidate, Benjamin Harrison, though Cleveland received a majority of the popular vote.

Harrison's administration was notable for the remarkable diplomacy of James G. Blaine, for the extension of the policy of reciprocity, for the passage of the McKinley Tariff Bill, the extension of the pension system by a dependent pension law, passed in 1890, by the repeal of the Bland-Allison law and the substitution of the Sherman Silver Purchase Act, requiring the Secretary of the Treasury to purchase 4,500,000 ounces of silver each month and to coin 2,000,000 ounces into dollars monthly. The monarchy in the Hawaiian Islands was overthrown, and a bill favoring annexation to the United States was passed by Congress. In 1892 the Democratic party returned to power, with Grover Cleveland and Adlai E. Stevenson as its candidates, the Republicans having nominated President Harrison and Whitelaw Reid. The People's party, or Populists, the successor of the Greenback-Labor party, nominated James B. Weaver of Iowa and received 22 electoral votes.

Financial Depression. The second administration of Cleveland opened with a terrible financial panic, with which most of the early important events of his term were connected, especially his efforts to repeal the Sherman law, his issuance of bonds to replenish the treasury gold reserve and the passage of the Wilson Tariff Law. The treaty of annexation of Hawaii was also withdrawn from the Senate, and the United States government made an effort to reestablish the monarchy over the islands. Cleveland's term was also marked by the successful intervention of the United States in a boundary dispute between Venezuela and Great Britain; by a great world's fair at Chicago; by the settlement of the Bering Sea controversy over the seal fisheries; by the extension of the civil service reform and by a great strike of railroad employes, which necessitated the calling out of Federal troops. The Democratic party failed to support the President in his financial policy, and at its convention in 1896 it nominated William Jennings Bryan of Nebraska for President, upon a platform demanding the free and unlimited coinage of

silver on the ratio of 16 ounces of silver to one ounce of gold. The Republicans nominated William McKinley of Ohio. A faction of the Democratic party formed a new organization, known as the National Democratic party, favoring the gold standard, and nominated John M. Palmer of Illinois. The Prohibitionist candidate was Joshua Levering; the Socialist Labor standard bearer was Charles H. Matchett. The Populist party endorsed Bryan and the Free Silver Prohibition party nominated Charles E. Bentley. McKinley was elected by a large electoral and popular majority.

Spanish-American War and its Effects. The most important episode of McKinley's term was the Spanish-American War (which see). It resulted in the abolition of Spanish rule in Cuba and the establishment of military government under the United States, which continued until 1902, when the Republic of Cuba was organized. The war also brought into the possession of the United States the Philippine Islands and Porto Rico. In 1898 Hawaii was annexed to the United States, and in 1900 it was made a territory.

A law establishing the gold dollar as the standard of currency was adopted in 1900, and bills reorganizing the army and abolishing the army canteen were passed in 1901. The United States participated in a joint international military expedition to China, to assist in the suppression of the Boxer rebellion, in 1900. The diplomatic events following this expedition emphasized the change in the position of the United States in international affairs, and showed its new rank as a world power.

The chief issues in the campaign of 1900 were imperialism, that is, the question of the retention of the Philippine Islands, and the trust problem. McKinley was again the Republican nominee, and Bryan was the Democratic candidate. McKinley was elected by an increased majority. Soon after his inauguration, President McKinley was assassinated, while attending the Pan-American Exposition at Buffalo, and he was succeeded by Theodore Roosevelt, who retained McKinley's Cabinet and furthered his policy.

Commercial and Economic Expansion. During Roosevelt's administration, the important events were the passage of the Chinese Exclusion Bill; a law providing for the irrigation of the arid lands of the West; the conclusion of a reciprocity treaty with

Cuba; the creation of a department of Commerce and Labor, which in 1913 was reorganized into the Department of Commerce and the Department of Labor, the passage of the bills for the reorganization of the militia, the increase of the navy and the creation of a general staff for the army; the passage of an anti-trust law in 1903; the ratification of a treaty between the United States and Great Britain, giving the United States the right to construct and maintain a canal across the Isthmus. In 1904 a treaty was concluded with the new Republic of Panama providing for the construction of the Panama Canal. Roosevelt's administration was also marked by the successful conclusion of a treaty fixing the boundary between Alaska and the Northwest Territories of the Dominion of Canada, the result being generally favorable to the United States. The campaign of 1904 turned on the personalities of the candidates and on the questions raised by the policy of the Roosevelt administrations. Roosevelt was elected by a large majority over Alton B. Parker, the Democratic candidate. The successful intervention of President Roosevelt to end the Russo-Japanese War, the prosecution of several large corporations for violation of the anti-trust law, the agitation for regulation of railroad rates, the rigid investigations of insurance corporations, and the movement for the conservation of natural resources are important in Roosevelt's second administration.

Republican Defeat. In the election of 1908, William Howard Taft, the Republican candidate, was successful over Bryan. In the spring of 1909 the President called Congress in special session to revise the tariff. But the new tariff was unpopular, and was one of the strongest factors in causing the election of a majority of Democrats to the House of Representatives in 1910. This Congress passed acts for the admission of Arizona and New Mexico as states, and considered a reciprocity treaty with Canada which was finally rejected by the Canadians.

The election of 1912 was marked by a split in the Republican party. The regular Republicans renominated Taft and Sherman, but the supporters of Roosevelt, charging that they had been defrauded of their rights in the convention, withdrew, held a convention of their own and formed the national Progressive party, which nominated Roosevelt for President and Hiram Johnson of Cali-

fornia for Vice-President. The Democratic candidates, Woodrow Wilson and Thomas R. Marshall, were elected by a plurality of more than 2,000,000 votes.

Wilson's Administration. Immediately after his inauguration President Wilson called Congress in special session to revise the tariff; the Underwood-Simmons Tariff Act was the result. Other important legislation included the Federal Reserve Act of 1913, establishing the Federal Reserve Banks, the Clayton Anti-Trust Act, the Trade Commission Act, and the repeal of the clause exempting American ships from paying toll for passing through the Panama Canal, in 1914. The opening of the Panama Canal to commerce, the international expositions at San Francisco and San Diego, Calif., the Bryan arbitration treaties with most of the world's civilized nations, and the proclamation of the seventeenth amendment to the Constitution were other important events of Wilson's first term.

Foreign relations occupied the attention of the President and of Congress to an unusual extent. During Taft's administration a revolution occurred in Mexico. Madero, the President, was assassinated, and Huerta, who was considered responsible for Madero's death, had assumed the Presidency. Wilson refused to recognize Huerta, but maintained a strictly neutral policy towards Mexican affairs, notwithstanding many insults were offered to American citizens and the government of the United States.

Affairs came to a crisis in April 1914, when a number of marines from a United States warship stationed at Tampico were arrested by Huerta's soldiers, while they went ashore peaceably to purchase supplies. Rear-Admiral Mayo demanded the release of the men, an apology and a salute to the United States flag. Huerta refused to salute the flag, and the President applied to Congress for permission to employ the military and naval forces to enforce his demands. His request was granted, and United States forces occupied Vera Cruz. There was a strong demand for intervention, but the President continued his policy of "watchful waiting", in the belief that the forces under Carranza would soon overthrow Huerta, and this they finally accomplished.

After Carranza became President, Villa, his chief aid in the overthrow of Huerta, rebelled and gained control over a number

of the northern states of Mexico. In 1916 Villa's forces made a number of marauding raids into Texas, Arizona and New Mexico, and a punitive expedition under command of General Pershing, in conjunction with the forces of Carranza, attempted to capture Villa, but he escaped to the mountains, and in course of time the United States force was withdrawn.

The embargoes and blockades established by the belligerent nations in the World War complicated American relations with these nations, especially with Great Britain and Germany, because of the effect of these measures upon American commerce. The sinking of the *Lusitania*, May 7, 1915, by a German submarine, came near severing diplomatic relations between the United States and Germany, but the Imperial Government made promises that partially satisfied the President, and the breach was avoided. Germany's acts aroused intense feeling against the country in the United States, and many Americans expected and desired war.

In the campaign of 1916 the nominees of the Republican party for President and Vice-President were Charles Evans Hughes of New York and Charles W. Fairbanks of Indiana. President Wilson and Vice-President Marshall were the Democratic nominees. The Republicans attacked the President's foreign policies, such as his "watchful waiting" in regard to Mexico and his long drawn-out diplomatic contest with Germany, and they opposed the economic theories of the Democrats. The Democrats asked for an endorsement of Wilson's record for constructive statesmanship in domestic affairs and approval of his forbearance and patience in the handling of intricate international problems. One of the rallying cries of the Democrats was "Wilson kept us out of war." The election was very close, for the country was plainly confused as to the exact attitude of both parties toward Germany. Wilson and Marshall secured 276 electoral votes and Hughes and Fairbanks 255. The Republicans carried the East and several Middle West states; the Democrats carried most of the West, part of the Middle West, and the South solidly. In general, the President ran ahead of his party, but the Democratic majority in Congress was considerably reduced.

The Approach of War. In spite of his record as a peace President, Wilson was forced to lead the country into the World

War early in his new administration. On January 31, 1917, the German government made known its decision to begin unrestricted submarine warfare. The President was informed that American ships of any kind whatsoever violating certain specified regulations would be sunk without warning. This decision was the culmination of a long series of insults on the part of Germany, including the indefensible activities of an unscrupulous and well-organized spy system.

With the approval of the majority of the people, the President on February 3 broke off diplomatic relations with Germany and handed Count Bernstorff, the German ambassador, his passports. After several weeks of uncertainty, during which German aggressions continued unchecked, the President (April 2, 1917) appeared before a special session of the Sixty-fifth Congress, and in a speech of moving eloquence asked that body to declare that a state of war existed between the Imperial German government and the United States. The next day the Foreign Affairs Committees of both houses agreed upon a resolution formally declaring this fact. On April 4 the Senate passed the resolution by a vote of 83 to 6 and the House took similar action on April 6 by a vote of 373 to 50. On the afternoon of that day the resolution was signed by the President.

In the World War. Measures relating to the prosecution of the war were given immediate consideration. As emergencies arose, laws conferring extraordinary powers upon the President, providing for regulating the distribution of food and fuel, placing the operation of the railroads and finally of the telegraph and telephone lines under control of the government, were passed. Regardless of party, Congress and the nation supported the President in the prosecution of the war. Taxes were increased, and five government loans aggregating over \$19,000,000,000 were authorized and oversubscribed. Never before had a nation accomplished a task of such magnitude within the allotted time as did the United States in prosecuting the war with Germany.

At the declaration of war America had an army of less than 200,000 men. The nation was insufficiently supplied with arms, munitions and other equipment for a large army, and was without sufficient ships for transporting men and supplies to Europe. Through the coöperation and help of its

Outline on the United States

- I. LOCATION AND EXTENT
 - (a) Latitude
 - (b) Longitude
 - (c) Boundaries
 - (d) Area
 - (e) Comparison with other countries
- II. SURFACE AND DRAINAGE
 - (a) Atlantic slope
 - (b) Appalachian highlands
 - (c) Great central plain
 - (d) Rocky Mountain highlands
 - (e) Pacific slope
 - (f) River systems
 - (g) Lakes
- III. CLIMATE
 - (a) Conditions expected, due to latitude
 - (b) Changes wrought by physical conditions
 - (c) Average temperature in various sections
 - (d) Average rainfall in various sections
 - (e) Need for irrigation
- IV. INDUSTRIES
 - (a) Mineral resources
 - (1) Where each is found
 - (2) Annual output and value
 - (3) States leading in production
 - (b) Agricultural products
 - (1) Cereals
 - (2) Fruits
 - (3) Market gardening
 - (4) Live stock and dairy products
 - (c) Manufactures
 - (1) Natural locations of districts
 - (2) Leading industries
 - (a) Iron and steel
 - (b) Textiles
 - (c) Boots and shoes
 - (d) Others of note
 - (e) Rank with other nations in production
 - (d) Commerce
 - (1) Domestic commerce
 - (a) By rail
 - (b) By water
 - (c) Coasting trade
 - (2) Foreign commerce
 - (a) Leading countries included in
 - (b) Exports and imports
 - (c) Principal countries engaged in carrying trade
- V. POPULATION
 - (a) Per cent of annual increase
 - (b) Center and density of population
 - (c) Comparative growth of cities and rural communities
 - (d) Immigration
- VI. GOVERNMENT
 - (a) General character
 - (b) Departments
 - (1) Executive
 - (a) President
 - (b) Vice-President
 - (2) Legislative
 - (a) Congress
 - (1) Senate
 - (2) House of Representatives
 - (3) Judicial
 - (a) Supreme Court
 - (b) Inferior courts
 - (1) Circuit courts
 - (2) District courts
 - (3) Courts of appeals
 - (c) State governments
 - (d) Government of dependencies
 - (e) Territories
- VII. EDUCATION IN UNITED STATES
- VIII. CITIES
 - (a) List of twenty-five largest
- IX. HISTORY
 - (a) Periods
 - (1) Discovery and exploration
 - (2) Colonization
 - (3) Development of colonies
 - (4) War for independence
 - (5) Organization of republic
 - (6) National growth

- (a) Development of resources
- (b) Annexation of territory
- (7) Mexican war
- (8) Slavery issue
- (9) Civil war
- (10) Reconstruction
- (11) Industrial progress
- (12) Spanish-American war
- (13) World War

Questions on the United States

How does the United States compare in area with the other great countries of the world?

How does it compare with them in population?

When it is 6 P. M. in Manilla, what time is it in New York?

What change does a ship have to make in its dates in going from San Francisco to the Philippine Islands?

What geographic conditions exert the greatest influence upon human development?

What effect does the geographic position of the United States have upon her industrial development?

How does this location affect her relations to other countries?

Why were the English colonies confined to a narrow strip of land along the Atlantic Coast?

What is the most remarkable feature of the boundary line between the United States and Canada?

Why is the Atlantic coast line so much longer than that on the Pacific?

Which coast has the larger number of good harbors? Why?

What is the Fall Line? Why is it so called?

What part of the United States is the greatest agricultural region in the world?

What conditions have made it so?

Account for the location and growth of the following cities: New York, Chicago, Galveston, Seattle.

How many railroads extend across the United States from the Mississippi River to the Pacific Coast?

What effect have these so-called trans-

continental lines had upon the development of the country west of the Mississippi River?

How does the Constitution of the United States differ from the Articles of Confederation?

What political party supported the ratification of the Constitution? From what circumstance was this party named?

What American inventions have exerted the greatest influence upon the industries and commerce of the world?

What regions in the United States are widely known for their scenery?

What has the National government done to preserve these regions for the people?

What island possession of the United States is about two-thirds the area of Connecticut? How does it compare with Connecticut in population?

From what nations did the United States receive the largest number of immigrants in the years just preceding the World War?

What effect did the World War have upon immigration?

How do you account for the rapid growth of cities since 1890?

What effect did the entrance of the United States into the World War have upon the American merchant marine?

What precedents of long standing did President Wilson set aside?

Why does not the United States have a national system of education?

To what does the League of Nations bind the United States?

How many Americans were killed in the World War? How many died of disease? How many were wounded?

How important are the new oil fields in Texas?

What cities in the United States are almost directly north of the city of Panama, at the western terminus of the Panama Canal?

What is the status of woman suffrage in the United States?

What is the status of Porto Rico?

What is the "Galveston plan" in the government of cities?

allies, the unstinted devotion and loyalty of the American people and a speeding up of all war activities, the United States placed on the battlefields of France over 2,225,000 soldiers, trained and equipped, including needed men back of the lines. The American army played an important part in the operations of the summer of 1918, and contributed materially to bringing about an armistice on November 11, 1919. (For a full account of the nation's war activities, see the article **WORLD WAR**.)

The Way to Peace. During America's participation in the struggle President Wilson had issued a statement summarizing the objects for which America was fighting. These were grouped into fourteen paragraphs, the last of which called for a general association of the nations. This suggestion for a league of nations became the cornerstone of Wilson's peace policies. As spokesman on the moral issues of the war, the President became the outstanding figure in the diplomacy of the struggle, and it seemed fitting that he should head the American delegation to the peace conference, which met in Paris in January, 1919. His decision to cross the ocean and to remain away from his country a considerable length of time caused much discussion and some bitter criticism, as always happens when a precedent is broken. The President, however, felt that his personal attendance at the peace sessions was essential. The other American delegates were Secretary of State Lansing, General Tasker H. Bliss, Henry White, former minister to Germany, and Edward M. House, personal adviser of the President.

Wilson returned to America late in February to sign bills essential to carrying on the activities of the government, and after a week's stay returned to Paris, where he remained until the signing of the Treaty of Versailles, June 28. He reached home in July, and on the tenth of the month addressed a joint session of the Sixty-sixth Congress, which he had called by cable to meet in special session on May 19. The President gave a general summary of the results of the peace conference and voiced his conviction that a league of nations was vital to the future peace of the world. He then submitted the treaty to the Senate for ratification.

In the fall elections of 1918 the Democrats had lost heavily; the Republicans had a majority of two in the Senate and they con-

trolled the House of Representatives. Considerable opposition to the proposed league had developed during the President's absence, and the President, sensing the need of solidifying sentiment for the covenant, began a speech-making tour in August in behalf of the treaty, but serious illness soon sent him home. For many months in the Senate the fate of the treaty was in doubt; the President was opposed to its alteration.

Recent National Issues. The great international questions that occupied the administration after 1914 somewhat overshadowed the events of domestic interest. By January, 1919, the XVIIIth Amendment to the Constitution, prohibiting the manufacture and sale of liquor, had been ratified by the requisite number of states, and a government proclamation set January 16, 1920, as the date for the amendment to go into effect. In November, 1918, however, President Wilson signed a food production bill making the United States prohibition territory after June 30, 1919. The XIXth Amendment, extending suffrage rights to women throughout the country, was adopted by both houses of Congress in the spring of 1919, and was ratified by thirty-six states in 1920. In 1921 a law creating a budget system to regulate national finances was passed and put into effect. In 1923, the immigration policy was earnestly discussed, and in May, 1924, a new law was passed, greatly restricting foreign immigration. The same congress also passed a soldiers' bonus law, over President Coolidge's veto.

A new tax law lowering taxes for 1924 was passed by this Congress.

Related Articles. At the end of each state article the reader will find listed the names of the cities, mountains, lakes and rivers of the region under discussion, as well as important historical events connected with the development of each state. There are other important lists following the articles on Agriculture, Education, and the different wars in which America has engaged, to all of which the reader is referred. Below are various other topics which will help one to secure detailed information on the subject.

PHYSICAL FEATURES

| | |
|---------------------|----------------------|
| Alleghany Mountains | Niagara Falls and |
| Appalachian Moun- | River |
| tains | Ohio River |
| Canyon | Palisades |
| Cascade Range | Parks, National |
| Coast Range | Piedmont Region |
| Colorado, Grand | Rocky Mountains |
| Canyon of the | Royal Gorge |
| Columbia River | Saint Lawrence River |
| Glacier National | Sierra Nevada |
| Park | Mountains |
| Great Lakes | Yellowstone National |
| Mammoth Cave | Park |
| Mississippi River | Yosemite National |
| Missouri River | Park |
| Natural Bridge | |

INDUSTRY AND PRODUCTS

| | |
|------------------------|--------------|
| Agriculture | Irrigation |
| Automobile | Lead |
| Barley | Leather |
| Bookbinding | Lumber |
| Boots and Shoes | Meat Packing |
| Brick and Brick-laying | Natural Gas |
| Coal | Oats |
| Copper | Paper |
| Corn | Petroleum |
| Cotton | Potatoes |
| Cotton Gin | Poultry |
| Dairying | Printing |
| Dry Farming | Seal |
| Fish and Fisheries | Silver |
| Forests and Forestry | Steel |
| Fur and Fur Trade | Textiles |
| Gold | Tobacco |
| Horticulture | Wheat |
| Iron | Zinc |

TRANSPORTATION AND COMMUNICATION

| | |
|-------------------|-------------------|
| Cable, Submarine | Roads and Streets |
| Canal (with list) | Telephone |
| Railroad | Telegraph |

OUTLYING POSSESSIONS

| | |
|--------------------|-------------------|
| Alaska | Porto Rico |
| Guam | Samoa |
| Hawaii | Virgin Islands of |
| Philippine Islands | the United States |

PRESIDENTS

See President of the United States

STATESMEN, MILITARY LEADERS, ETC.

See Biography

GOVERNMENT AND HISTORY

| | |
|-----------------------------------|--|
| Alabama, The | Louisiana Purchase |
| Alien and Sedition Laws | Mexican War |
| Black Hawk | Missouri Compromise |
| Boston Massacre | Monroe Doctrine |
| Boston Tea Party | Mound Builders |
| Burr, Aaron | Nations, League of |
| Chesapeake, The | Navigation Acts |
| Clayton-Bulwer Treaty | Non-Intercourse Act |
| Confederation, Articles of | Northwest Territory |
| Congress | Nullification |
| Constitution of the United States | Ordinance of 1787 |
| Carpetbaggers | Ostend Manifesto |
| Courts | Panama Canal |
| Declaration of Independence | Political Parties in the United States |
| Electoral College | Prohibition |
| Electoral Commission | Puritans |
| Emancipation Proclamation | Representatives, House of |
| Embargo | Revolutionary War |
| Eric the Red | Senate |
| French and Indian Wars | Slavery |
| Genet, Edmon | Spanish-American War |
| Hay-Pauncefote Treaty | Squatter Sovereignty |
| Indians, American | Star Route |
| Jay Treaty | Supreme Court |
| Kentucky and Virginia Resolutions | Tariff |
| Ku-Klux Klan | Versailles, Treaty of |
| Lecompton Constitution | War of 1812 |
| | Whisky Insurrection |
| | Wilmot Proviso |
| | Woman Suffrage |
| | World War |
| | X Y Z Correspondence |

UNITED STATES STEEL CORPORATION, the largest business enterprise in the world, was organized in 1901, by the consolidation of a number of large corporations engaged in the manufacture of iron and steel. These included the Carnegie, the Federal Steel, the American Steel and Wire, the National Steel, the National Tube and the American Tin Plate companies. The United States Steel Corporation makes more steel than all of Great Britain or Germany,

and one-fourth of the total amount made in all the countries of the world. Many of the employes have become stockholders, and the corporation has a commendable record in its dealings with its great army of workmen. In 1911 the United States government brought suit for the dissolution of the corporation on grounds of violating the Sherman Anti-Trust Law; in 1915 the courts sustained the corporation and an appeal was taken to the Supreme Court. There had been no decision on the appeal by September, 1919.

The capital of the corporation is over \$1,000,000,000, and its gross earnings exceed a million dollars for every working day.

UNIVER'SALISTS, a religious body whose distinctive belief is that all men will ultimately be saved; in other words, that eternal progress is the lot of every created soul. This, they claim, is in harmony with the teachings of Jesus and early interpretations of the Bible, as well as with science and philosophy. As a faith universalism has a place in Christian thought far beyond the confines of the organized body, which was established late in the eighteenth century in Massachusetts by an English clergyman, John Murray. There are now about 55,000 Universalists in the United States and 2,000 in Canada.

UNIVERSAL LANGUAGE, a proposed medium of communication, for the use of all peoples of the earth which have commercial intercourse with each other. There have been two unsuccessful efforts in this direction within recent years, Esperanto and Volapuk (which see).

UNIVERSE, *u'ni vurs*, a term referring to all created things, embracing everything included in space, planets, suns, stars, considered as an orderly system. Man's idea of the universe has been an expanding one. At first he considered the earth the center about which sun, moon and stars revolved. Then he discovered that earth, asteroids and planets revolve about the sun and thought of our solar system as the universe. Now he knows that the system of which our earth is a part is but one among the millions whirling majestically in the immensity of space. The universe in its vastness is beyond the power of the mind to conceive.

Related Articles. Consult the following titles for additional information:

| | |
|--------------------|--------------|
| Astronomy | Planet |
| Earth | Stars |
| Moon | Solar System |
| Nebular Hypothesis | Sun |



UNIVERSITY, an institution for advanced learning or for the examination of students who have completed specified courses in the higher branches. Universities are maintained in nearly all countries, and they confer degrees which receive universal recognition. A study of the organization of the universities of different countries shows that there are some variations in plan and spirit, but everywhere the term *university* implies a higher

grade of institution than does *college* (which see).

In the United States. In the United States the term *university* has been used indiscriminately and is sometimes applied to degree-conferring institutions, regardless of their provision for graduate work. Moreover, many schools established in the newer states, either by private or denominational enterprises, have been styled universities when they are really colleges offering courses given in the undergraduate department of the true university.

A university maintains a college of liberal arts, and faculties of law, medicine, engineering, agriculture, journalism, etc. In the universities of highest standard students entering the professional departments are required to have two or more years of college work.

According to the plan upon which they have been established, American universities can be grouped into the following classes:

(1) Those which have developed from older colleges, such as Harvard, Yale, Pennsylvania and Princeton.

(2) Those that have been established by act of legislature and are known as state universities, such as the universities of Michigan, Minnesota, Wisconsin and Illinois.

(3) Those that have been established by benefactions, such as Johns Hopkins and Cornell.

(4) Those established under the auspices of some religious denomination, such as the Catholic University, at Washington; the University of Chicago, and Northwestern University, at Evanston and Chicago.

All of these institutions maintain undergraduate, or college, departments, and in some of the newer states the state university

is under the necessity of maintaining a preparatory school.

German Universities. This class includes all universities where the German language is spoken, and in addition to those in Germany proper, it embraces the universities of Switzerland and Austria. In these universities the faculties of all departments are independent of one another; and the work of all is characterized by a scientific spirit which leads to the greatest freedom in original research. They derive their support from the government, but each is allowed the greatest liberty in the management of its own affairs and in the determination of its courses of study.

French Universities. The French universities are modeled after the University of Paris. A number of these were early organized; but during the French Revolution the universities, with all other educational institutions, were abolished. Upon the reorganization of affairs, Napoleon organized the University of France, which was at the head of the educational system. According to his plan, the university had charge of all higher education and was divided into fifteen faculties, located in as many educational districts, with the central authority at the University at Paris. This arrangement continued until 1896, when the districts were made independent, each being given control of its own affairs, under the direction of the minister of education.

English Universities. English universities are of two types, those founded during the Middle Ages, such as Oxford and Cambridge, which are unique among the universities of the world in their plan and organization, and those that have been founded since the eighteenth century, such as Durham University and the University of London, which is only a degree-conferring institution. Oxford and Cambridge are aggregations of separate colleges, each with its own faculty, rules of organization and traditions, but all subject to a central authority.

In Canada. Provincial and endowed universities and colleges are maintained in the Dominion in large numbers. The universities of British Columbia, Alberta, Saskatchewan and Manitoba correspond in a general way to the American state universities. In Ontario the University of Toronto is at the head of the school system. In Quebec the two leading universities, McGill

and Laval, are at the head of the Protestant and the Catholic schools, respectively.

(For more detailed information, consult the articles on the various institutions and provinces.)

Related Articles. The most important universities of the world are described in these volumes under their separate headings. They are listed at the end of the article Education. Each of the American state universities is given separate treatment in alphabetical order.

UNIVERSITY EXTENSION, a movement for extending the means of a higher education to persons of all classes, by a system of lectures and instruction, carried on by instructors of an established university. University extension originated with Cambridge University, England, in 1872, and it was taken up by the University of Oxford in 1885.

In the United States the movement was systematically started by Doctor Melville Dewey in 1888. At that time Doctor Dewey was chief librarian of Columbia University, and he laid before the regents of the University of the State of New York a plan for university extension, in connection with public libraries. Two years later a committee of the New York colleges and universities urged the regents to establish such a system of teaching under state supervision, and in 1891 a bill passed the legislature, appropriating \$10,000 for the expenses of organizing the movement. Previous to this, some extension work had been done by the professors of Johns Hopkins University, who, however, conducted it as an individual enterprise, and in 1891 the University of Pennsylvania organized a corps of lecturers, who were to lecture on literature, history, sociology and science in the surrounding towns, wherever local organizations for the study of any of these subjects could be formed. From these beginnings the larger universities took up the work, and it gradually extended over the country. The most successful work has been done by the universities of Pennsylvania, Cornell, Harvard, Yale, Chicago and Wisconsin.

The plan includes (1) the arrangement of lecture study courses with syllabi, by the faculties of the university; (2) the organization of local centers, these centers to include people who are interested in pursuing some one of the lecture courses; they decide upon the subject to be studied and engage the lecturer, whose salary and traveling expenses are paid by the center; (3) the lec-

ture, with studies conducted either before or after it, the lecturer carrying on a quiz, in which he gives opportunity for free discussion, asking and answering questions; (4) traveling libraries, which are sent to the different centers; (5) the preparation of papers by members of the center, these papers being read and graded by the lecturer; (6) the giving of credits by the university, for satisfactory completion of the work. These credits are of limited value to those who are seeking degrees. Agricultural colleges in some states have extension departments which render very practical assistance to the farmer and his family. The extension department of the University of Wisconsin is intended to cover practically all lines of industry in the state. See CHAUTAUQUA INSTITUTION.

UNTER DEN LINDEN, *un'ter dayn lin'den*, the finest and most famous avenue of Berlin, a mile in length and 196 feet in width, extending from the Brandenburg Gate to the monument of Frederick the Great and the Platz-am-Opernhaus. It is bordered by rows of beautiful linden and chestnut trees and flanked by many attractive shops. See BERLIN.

U'PAS, a tree belonging to the same family as the mulberry and breadfruit, common in the forests of Java and the Philippine Islands. The exaggerated stories formerly current concerning the deadly exhalations of this plant are now believed to have their origin in the presence of volcanic gases in the Javanese valleys. The sap, however, is poisonous and forms the principal element in a mixture used by the natives for tipping their arrowheads. The fiber of the bark is made into a kind of cloth.

U'RAL MOUNTAINS, a low mountain range in Russia extending southward from the Arctic Ocean, approximately along the 60th meridian of east longitude, and forming a portion of the boundary between Europe and Asia. The highest elevations are in the northern and southern sections and exceed 5,000 feet. The central section is low, and through a pass in this part of the range the Trans-Siberian Railway reaches Siberia. The lower slopes are covered with forests of evergreens, birch and beech. The Central Urals are rich in minerals, which include gold, silver, copper, iron, lead, zinc and platinum. There are also large deposits of coal.

URAL RIVER, a river of Russia, rising on the eastern slope of the Ural Mountains and flowing southward a distance of 1,400 miles into the Caspian Sea. Its chief tributaries are the Kizil and the Sak-Mara from the west, and the Sunduk, the Or and the Ilek from the east. Rainfall in the Ural basin is slight, and the river is shallow and unnavigable, except during the period of high water.

URA'NIA, in Greek mythology, the muse of astronomy, usually represented as holding in her left hand a celestial globe and in her right a staff or compass.

URA'NIUM, a rare, silvery-white metallic element, found chiefly as an oxide in pitchblende. It is the source of uranium yellow, used for painting on glass and porcelain, and in making the fluorescent yellow uranium glass. With its compounds, uranium is radioactive, undergoing slow disintegration with the formation of a new element, known as uranium X. See RADIOACTIVITY.

U'RANUS, the seventh planet from the sun, discovered by Sir William Herschel in 1781 and first called *Georgium Sidus*, in honor of George III, and afterwards *Herschel*, in honor of the discoverer. Both these names falling into disuse, the name *Uranus*, suggested by Bode, was adopted. Its mean distance from the sun is more than 1,750,000,000 miles. The length of its year is equal to about eighty-four of our years; the length of its day is thought to be about ten hours. Its mean diameter is estimated at about 33,000 miles. Its volume is about seventy-four times that of the earth, but its mean density is so much less that the mass of Uranus is only about twelve and one-half times as great as that of the earth.

Uranus has four satellites, which differ from those of all but one of the other planets, in that their orbits are nearly perpendicular to that of the planet, while the satellites of the other planets revolve in nearly the same plane as the planet to which they belong. Through the telescope, Uranus is merely a pale, greenish disk, with no certain markings; but the spectroscope seems to indicate that it differs materially from the other planets in composition. To the naked eye it appears like a star of the sixth magnitude. See PLANET.

URANUS, in Greek mythology, the husband of Gaea, the earth, and father of her children, the Titans and Cyclops. Uranus

hated his children and confined them in Tartarus, but on the instigation of Gaea, Saturn, the youngest of the Titans, overthrew and dethroned him. From the part of his blood which fell upon the earth sprang Gigantes, father of the giants, and from the part which fell into the sea sprang the goddess Aphrodite.

UR'BAN, the name of eight Roman Popes, three of whom made notable contribution to history.

Urban I, SAINT, was bishop of Rome from 222 to 230. He was a strong pontiff, setting himself firmly against the schismatic movement of Hippolytus, which he kept in check.

Urban II was Pope from 1088 to 1099. He successfully prosecuted the struggle of the Papacy against Henry IV, and in 1094 he excommunicated Philip I of France for his matrimonial infidelity. In 1095 he presided at the famous Council of Clermont, which gave the impulse to the Crusades. He died before the success of the First Crusade, which he had organized.

Urban VIII, Pope from 1624 to 1644, supported Richelieu's policy against Austria and Spain. He was the founder of the College of the Propaganda and was a patron of Galileo.

URBAN'A, ILL., the county seat of Champaign County, 128 miles nearly south of Chicago, on the Wabash, the Cleveland, Cincinnati, Chicago & Saint Louis railroads. It is near Champaign, and the state university is situated between the two cities (see ILLINOIS, UNIVERSITY OF). The surrounding region is agricultural and contains valuable deposits of fire clay. The city has railroad shops, brick works, a lawnmower and iron novelty factories. Some of the prominent structures are the courthouse, the municipal building, the Masonic Temple, a Y. M. C. A. building, Thornburn High School, the Champaign County Teachers' and Pupils' Library and the Illinois State Laboratory and Natural History Library. Urbana was settled in 1824 and was chartered as a city in 1860. Population, 1910, 8,245; in 1920, 10,230, a gain of 24 per cent.

URINE, *u'rin*, the fluid waste separated from the blood by the kidneys. It carries out of the system many of the wornout tissues, especially the nitrogenous waste. Its composition varies in different animals. Human urine, of a healthy individual, is a clear, amber-colored fluid, slightly acid, and it weighs one and fifteen-thousandths to one and twenty-five thousandths times as much as water. The average quantity discharged in

twenty-four hours is about two and a half pints, but the amount varies greatly, being diminished during excessive perspiration, thirst and fever, and being increased by cold, by drinking large quantities of water, by exercise, by certain foods, as salt or sugar, and by certain drugs. The principal solid and the most important ingredient found in urine is urea, the amount of which varies, being greater when animal food is used freely than when the diet is vegetable. The condition of the urine is an index to the state of health, and physicians often analyze it as a part of their diagnosis. The presence of albumin indicates Bright's disease, and the presence of sugar indicates diabetes.

URSA MAJOR and **URSA MINOR** (greater bear and lesser bear), two constellations of the northern hemisphere always visible and wheeling about the Polar Star, which at present is that star in the extremity of the little bear's tail. In the larger constellation are seven bright stars which outline the Great Dipper.

UR'SO, CAMILLA (1842-1902), a famous violinist, born in Nantes, France, who came to America at the age of ten. She appeared in concert with immense success, becoming the most noted female violinist in the world.

URSULA, SAINT, a legendary saint and martyr in the Roman Catholic Church, whose story has been given various forms. She is supposed to have suffered death about the year 237. By repute the daughter of a British king, she was desired by the son of another king for his wife; if his suit were denied, her father's lands would be devastated. Ursula had vowed to remain a virgin, so she succeeded in securing a three-years' delay before deciding. During this time she was to visit holy places, and she chose 11,000 virgins to accompany her. When Cologne was reached in a voyage down the Rhine the Huns murdered all of them; a church was later built over their remains.

URSULINES, *ur'su linz*, or **NUNS OF SAINT URSULA**, a sisterhood founded by Saint Angela Merici, at Brescia, Italy, in 1537, especially for the education of girls. They had many houses in France during the seventeenth century. The Canadian Ursulines date from 1639; the Irish, from 1771. There are now four houses in Ireland, four in England and twenty-four in the United States, with thousands of pupils. The whole number is 300 convents and 7,000 nuns.



Theater in Montevideo

URUGUAY, *u'roo gwa*, or *oo'roo gwi*, officially THE EASTERN REPUBLIC OF URUGUAY, is the smallest republic of South America. It is separated from Argentina on the west of the Uruguay River, and is bounded on the north-east and east by Brazil; the great estuary of the Rio de La Plata washes its southern shore. The country is nearly triangular in outline; its greatest length and breadth, 350 miles, are about equal; its area is 72,153 square miles, making it about one-half the size of Montana, or equal to the combined areas of North Dakota and Delaware.

The People. The population is about equally divided between the white and colored peoples, the latter including Paraguay Indians, or *Guarani*, and mixed breeds. Spaniards and Italians constitute the great majority of the whites, though the Germans and French are numerous. The speech, manners and customs are Spanish. The color line is drawn in the names of the political parties which are designated as *Blancos* and *Colorados* (whites and colored), but in political practice these names have lost much of their former significance. The chief cities are Montevideo (which see), the capital, with a population of 378,466 in 1916; Paysandu, on the Uruguay River; Mercedes, San José, Agosto and Maldonado.

The Roman Catholic Church has by far the largest number of adherents, and until 1916 it was the state Church. In that year the state Church was abolished, and all religious denominations were placed on an equal footing before the government.

Surface and Drainage. In the north and west there are ranges of low mountains, or hills, which attain an altitude of about 2,000 feet, and along the Uruguay River are tablelands, somewhat higher than those in Argentina; but the southeastern part of the country is low and marshy, and the interior is composed of rolling plains. The chief rivers are the Uruguay, which forms the western boundary, and its largest tributary, the Negro, which flows across the country in a southwesterly direction, dividing it into

two nearly equal parts. Lake Merim, situated on the northeastern border, is partly in Uruguay and partly in Brazil. The plains in the interior and the hills in the north and northwest are covered with dense forests, and the southeastern portion of the country is overgrown with grass.

Resources and Industries. The chief minerals are iron, zinc, lead, antimony, sulphur and coal, and some gold has been found. There are also quarries of marble and other building stone, but the mineral resources of the country have not been extensively exploited. The rich soil and salubrious climate, accompanied by an abundance of moisture, make the country favorable for agriculture, yet only small areas are under tillage. The chief crops are wheat, corn, barley, millet, oats, rye and flaxseed. Stockraising is the most important industry of the country, and large numbers of horses, mules, cattle and sheep are reared.

In 1917 there were over 8,000,000 cattle and 26,384,000 sheep. Wool is the chief export.

Transportation and Trade. Many of the rivers are navigable, and are used for inland transportation. There are over 1,600 miles of railway connecting the chief centers of trade within the country with those of Argentina, besides 170 miles of tramways. In proportion to its size, Uruguay has more miles of good roads than most other South American countries. All the important towns have telegraph and telephone service.

The imports consist of foodstuffs, cotton and woolen goods, clothing, machinery and other manufactured products. The exports include meats, hides, tallow, cattle, wool and a few other agricultural products.

Education. The University of Uruguay, at Montevideo, is the leading educational institution. It has departments of law, medicine, mathematics, agriculture, commerce, social service and veterinary science. There are also a preparatory school and other institutions for secondary education and normal schools for both sexes. Its library and museum are of considerable value. The public schools are poor. There is a compulsory education law, but it is not enforced, and the proportion of illiteracy is very large.

Government and History. Uruguay has a republican form of government, at the head of which is a President. This official was originally elected by the national legislative

body, consisting of a Senate and a Chamber of Deputies. In 1919 a new constitution went into effect, providing for the popular election of the President and the Council of Administration of nine members, which appoints the following members of the President's Cabinet: the Ministers of Industries and Labor, Public Instruction, Finance and Public Works. The President appoints the Ministers of Foreign Affairs, Interior, Army and Marine. The Council prepares the budget, collects the taxes, may initiate new laws, arranges loans and provides for the increase or reduction of the national currency.

Uruguay was a source of dispute between Spain and Portugal in early times, but finally became a Spanish possession, forming a part of the vice-royalty of Buenos Aires. Later Brazil attempted to enforce the Portuguese claim, and for a short time occupied the country, but in 1828 Uruguay became independent. In October, 1917, the country severed diplomatic relations with Germany.

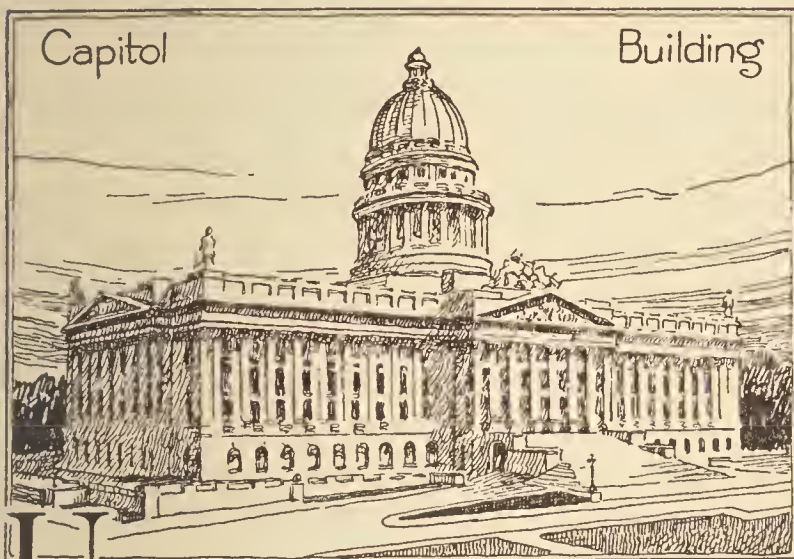
Uruguay River, a river of South America, which rises in the southeastern part of Brazil, flows westward, then southward, and enters the estuary of the Rio de la Plata. It forms a part of the boundary between Brazil and Argentina and the entire boundary between Argentina and Uruguay. Its length is about 950 miles, and in the lower part of its course it is from six to nine miles wide. It is navigable for large vessels as far as Paysandu, about 150 miles, and for smaller vessels for 300 miles farther.

USURY, *u' zhu ry*, originally, money paid for the use of money, or interest; according to present usage, interest in excess of the legal rate. In most states a maximum rate of interest is fixed by law, and penalties of greater or less severity, imposed for charging a higher rate. The table below gives the legal rate of interest in each of the states, and also the rate permitted if both parties agree. See INTEREST.

| STATES | Legal Rate | Contract Rate | STATES | Legal Rate | Contract Rate |
|---------------|------------|---------------|---------------|------------|---------------|
| | Per Cent | Per Cent | | Per Cent | Per Cent |
| Alabama ... | 8 | 8 | Florida | 8 | 10 |
| Alaska | 8 | 12 | Georgia | 7 | 8 |
| Arizona | 6 | 10 | Idaho | 7 | 12 |
| Arkansas .. | 6 | 10 | Illinois | 5 | 7 |
| California .. | 7 | * | Indiana | 6 | 8 |
| Colorado ... | 8 | | Iowa | 6 | 8 |
| Connecticut | 6 | 6 | Kansas | 6 | 10 |
| Delaware .. | 6 | 6 | Kentucky .. | 6 | 6 |
| D. of Col. .. | 6 | 10 | Louisiana .. | 5 | 8 |

| STATES | Legal Rate | Con- tract Rate | STATES | Legal Rate | Con- tract Rate |
|----------------|------------|--------------------|----------------|------------|--------------------|
| | Per Cent | Per Cent | | Per Cent | Per Cent |
| Maine | 6 | * | Ohio | 6 | 8 |
| Maryland .. | 6 | 6 | Oklahoma .. | 6 | 10 |
| Mass. | 6 | * | Oregon | 6 | 10 |
| Michigan .. | 5 | 7 | Penn. | 6 | 6 |
| Minnesota .. | 6 | 10 | R. Island .. | 6 | * |
| Mississippi .. | 6 | 10 | S. Carolina .. | 7 | 8 |
| Missouri ... | 6 | 8 | S. Dakota .. | 7 | 12 |
| Montana ... | 8 | * | Tennessee .. | 6 | 6 |
| Nebraska ... | 7 | 10 | Texas | 6 | 10 |
| Nevada | 7 | * | Utah | 8 | 12 |
| New Hamp. .. | 6 | 6 | Vermont ... | 6 | 6 |
| New Jersey .. | 6 | 6 | Virginia ... | 6 | 6 |
| New Mexico .. | 6 | 12 | Wash. | 6 | 12 |
| New York .. | 6 | 6 | W. Virginia .. | 6 | 6 |
| N. Carolina .. | 6 | 6 | Wisconsin .. | 6 | 10 |
| N. Dakota .. | 7 | 12 | Wyoming .. | 8 | 12 |

*Any rate on which both parties may agree.



UTAH, one of the Rocky Mountain states, originally settled by the Mormons. They called the territory which they had organized *Deseret*, a name meaning *industry* as used in the Book of Mormon. Congress, however, refused to permit the use of this name, and the territory was organized under the present name, which is the designation of the Ute, or Utah, a tribe of Indians, and means *highlanders*. Because of the presence within its borders of the extensive salt lake so widely known, Utah is popularly, though not officially, called the *Salt Lake State*.

Location and Area. The state is bounded on the north by Idaho and Wyoming, on the east by Colorado and Wyoming, on the south by Arizona and on the west by Nevada. It has straight bounding lines on all sides, and is regularly oblong in shape, except in the northeastern corner, where the southwestern corner of Wyoming cuts off several square miles.

Having an area of 84,990 square miles, the state is the tenth in the Union in size; it is only 308 square miles larger than Minnesota,

and is almost exactly twice as large as the state of Virginia.

People and Cities. Utah had a population of 449,396 in 1920, when it ranked forty-first in the Union in number of inhabitants. The average density per square mile was 5.5; only six other states are less densely settled. In January, 1910, according to the Federal census, the population was 373,351. A little less than eighteen per cent of the whole population is foreign born, the principal nationalities being English, Danish, Swedish, Greek, German, Italian, Scotch and Norwegian. There are about 1,800 Indians on reservations, and about 1,200 negroes.

About three-fourths of the inhabitants are adherents of the Church of Latter Day Saints (Mormon). Roman Catholics, Methodists, Presbyterians and various other sects are found in small numbers.

About fifty per cent of the inhabitants live in municipalities having 2,500 population or more. The largest cities are Salt Lake City, the capital (118,110, Federal census for 1920), Ogden and Provo City.

Surface and Drainage. The surface is greatly diversified, containing high mountains, broad, arid valleys and desert plateaus. Near the middle of the northern boundary, the Wasatch Mountains enter the state and extend southward along the middle line, finally degenerating into plateaus. This is the principal mountain range of the state, and its position marks the highest land, from which, as a watershed, the streams flow eastward and westward, the former to the Colorado, the latter to sink in the Great Basin. Eastward from the Wasatch, along the northern boundary of Utah, stretches a broad, massive range, known as the Uintah.

Great Salt Lake, with its extraordinary percentage of saline matter in solution, is but the remnant of a vast body of fresh water, which once covered Western Utah. The principal stream of Eastern Utah is the Colorado. This is formed by the junction of Green River, which rises in the Wind River Mountains of Wyoming and the Grand, whose sources are in the snow fields on Long's Peak, in Colorado. The Green and the Colorado receive numerous branches from the Uintah and Wasatch ranges, among them the Uintah, the Price, the Fremont, the San Rafael and the Virgin. The scenery is varied, including fertile valleys, snow-capped mountains, the Great American Desert (an area as

large as Connecticut), deep canyons, dashing Cascades and the greatest natural bridges in the world, including the Nonnezoshi Bridge, noted for its great height, and the Rainbow Bridge, named from its beautiful arch.

Climate. The mean annual temperature ranges from 48°, in the north, to 51°, in the south. The mean temperature at Frisco is 51°. The average rainfall is 16 inches. If the snow chances to fall early in the winter, it becomes compact, and the melting is retarded. A fall of snow late in the season lies loosely on the mountain sides, and the water reaches the valleys before the crops are ready to receive its full benefit.

Mineral Resources. Next to agriculture, mining is the chief industry of Utah. Silver is found in nearly all the mountains, and in 1922 Utah led the states in the production of this metal. The gold product is about \$2,500,000. Utah ranks third in the production of copper and fourth in lead. Other important metals are iron and zinc. There are extensive coal fields in Emery, Carbon and Summit counties, the largest sulphur deposits in the world are in Millard and Washington counties, and a superior quality of onyx is found on the west shore of Utah Lake. Salt is mined in Juab County and is obtained from Great Salt Lake. Other mineral products are asphalt, building stone, mica, graphite and gypsum. The state also has a natural gas area.

Agriculture. The agricultural districts of the state are chiefly in the valleys immediately west of the Wasatch Mountains, in the Great Basin. Elsewhere, except in a few favored spots, the altitude or the insufficient water supply east of the Wasatch range, prevents successful farming. This vast area is used for grazing, and large herds of sheep and cattle are raised. Many sheep are exported, and the annual production of wool exceeds 15,000,000 pounds.

Irrigation in the Great Basin of Utah was the first important enterprise of the kind by Anglo-Saxons in the arid west. In 1847, the Mormon pioneers turned the waters of City Creek upon the parched soil of Salt Lake Valley, and now, out of 1,250,000 acres of improved land, over 1,000,000 acres are irrigated. The wheat, oats, barley, hay and rye are of superior quality, and the yield is large. In most localities the heights are too cool for successful corn-growing. Potatoes, beets and other vegetables are profitably

raised. Utah is the fourth state in the production of sugar beets. Fruits are abundant. Among these are apples, peaches, plums, apricots, cherries and grapes; and in the south, oranges, lemons and figs are grown.

Manufactures. The leading manufacturing industry is the smelting and refining of copper and lead ores. Other industries, in the order of their importance, are the manufacture of beet sugar, flour and grist milling, construction and repair of railroad cars and locomotives, the manufacture of butter and cheese, the canning of fruits and vegetables, the manufacture of boots and shoes and of salt. The drying of fruits is an important industry.

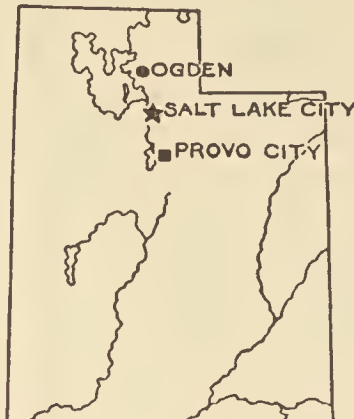
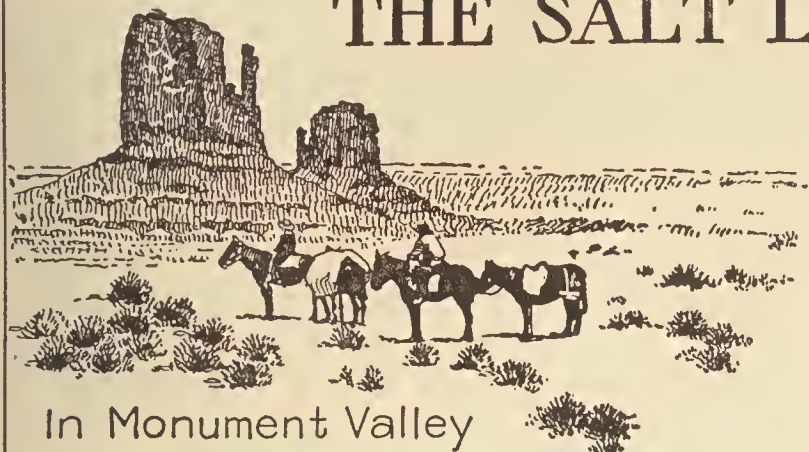
Transportation. The state has railway communication with all the great cities, east and west. The principal roads are the Union Pacific, the Southern Pacific, the Denver & Rio Grande, the San Pedro, Los Angeles & Salt Lake and the Western Pacific. Short lines connect the mining towns with the principal cities. In all, the state has about 2,350 miles of railway lines. Utah has a considerable local commerce. The state exports, however, a large proportion of the products of the mines and ranges.

Government. The legislature consists of a senate and a house of representatives. The number of senators can never exceed thirty and the number of representatives cannot exceed three times, or fall below twice, the number of senators. Both senators and representatives are apportioned by districts, one-half of the senators being elected every two years, for a term of four years, and the representatives being elected for two years. The executive department consists of the governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, elected for four years. The state courts comprise a supreme court, consisting of three judges, elected for six years, and such inferior courts as may be established by law. The judges of the district courts are elected for four years. The state constitution provides for woman suffrage.

Education. The present educational system dates from 1890, when a uniform system of public schools was established, taking the place, to quite an extent, of schools that had been maintained by various church organizations. High schools are supported in all of the larger towns and cities, and there is a state university at Salt Lake City, with which

UTAH

THE SALT LAKE STATE



Population of Cities

- ★ Over 120,000
- 30,000 to 35,000
- 10,000 to 15,000



the state normal school is connected. The state agricultural college is at Logan, with experiment stations in the Saint George region and at Nephi. The Mormon Church also has an educational system peculiarly its own, and well organized. At the head of this are the Latter Day Saint's University, in Salt Lake City, Brigham Young College, at Logan, and Brigham Young Academy, at Provo. Schools are also maintained by other denominations.

Institutions. Penal and charitable institutions are under the control of boards appointed by the governor. They include an industrial school at Ogden, a hospital for the insane at Provo City, a school for the deaf and blind at Ogden, and a state penitentiary at Salt Lake City.

History. The first white visitors to Utah were the members of Coronado's expedition in 1540, but the territory was not settled for nearly three hundred years. In 1824 Great Salt Lake was discovered by James Bridger, and soon afterwards trading posts were set up in its vicinity. The real history of Utah begins with the coming of the Mormons in 1847. In the following year the United States gained possession, under the Treaty of Guadalupe Hidalgo, and in 1849 a constitution for the "State of Deseret" was adopted. Though Congress refused admis-

sion to the new state, it organized the Territory of Utah, including a much greater area than the state now has. The attempt of the Mormons to keep other settlers out of the territory led to an expedition of Federal troops in June, 1858, which took possession of Salt Lake City. The practice of polygamy among the Mormons was viewed with disfavor by Congress, and a law making it a crime was passed in 1862, but was not seriously enforced for many years. Finally, twenty years later, the Edmunds bill, disfranchising polygamists and placing the territory under a commission of five men, was passed. This was made more stringent in 1887 and again in 1890, but in the latter year the Mormon Church declared that it no longer countenanced polygamy. Finally, in 1894, a constitution was adopted, and the state was admitted to the Union two years later. Prohibition was voted for the state in advance of national action.

Related Articles. Consult the following titles for additional information:

CITIES

Logan
Ogden

Provo City
Salt Lake City

PHYSICAL FEATURES

Colorado River
Great Salt Lake

Uinta Mountains
Utah Lake

UNCLASSIFIED

Dry Farming
Irrigation
Mormons

Polygamy
Young, Brigham

Items of Interest on Utah

The state motto of Utah is the word *Deseret*, meaning *industry*. Utah's flower emblem is the sego lily.

Statewide prohibition was adopted in 1917.

School attendance for thirty weeks annually is compulsory for children from eight to sixteen years, who live in large cities. Elsewhere the required attendance is for twenty weeks. There are about 650 public elementary schools and nearly fifty public high schools.

The constitution provides for the initiation of any desired legislation by the legal voters or such number of them as may be determined by law.

Among the points of scenic interest is a pulpit-shaped rock in Echo Canyon. It is said that Brigham Young preached in this pulpit his first sermon to the Mormon colonists.

In 1915 there was an uprising of the Indians on the Piute Reservation. To settle the difficulty General Hugh Scott was sent out by the government.

Four barrels of the water of Great Salt Lake will produce, after evaporation, nearly a barrel of salt.

Questions on Utah

What is peculiar about the boundaries of Utah?

Describe briefly the surface and drainage.

What artificial aids are necessary to agriculture in Utah?

What are the principal crops?

How does Utah rank as a producer of beet sugar?

How does Utah rank in the production of silver? Copper? Lead? Name two other important mineral products.

What are the principal commodities shipped to points outside the state?

What are the principal manufacturing industries?

What sensation do swimmers in Great Salt Lake experience?

In what year did the Mormons emigrate to Utah?

What can be said of the great natural bridges in the state?

UTAH, UNIVERSITY OF, a state university established at Salt Lake City in 1850, as the University of the State of Deseret. Soon after its establishment, the school was closed until 1867, owing to lack of funds. The present charter was secured in 1891, when a grant of sixty acres of land and a state appropriation of \$300,000 for buildings were made. At that time the present name was adopted. The university maintains a school of arts and science, a state school of mines, schools of education, medicine, law and commerce and finance, and the state normal school. The faculty has a membership of over 150, and the student enrollment is about 2,600. There is a library of over 50,000 volumes. The legislature has made liberal grants for improvements, and has provided a state tax to insure a regular income.

UTAH LAKE, a fresh-water lake in the north-central part of Utah, about twenty-four miles in length and eight miles in width. It is situated in a valley bordered by mountains, and it discharges into Great Salt Lake through the Jordan River.

UTE, a tribe of Indians of the Shoshonean family, formerly scattered throughout New Mexico, Utah, Colorado and Nevada, where they carried on a relentless warfare with the Navajos. They were a restless tribe, living by hunting and fishing, but rarely engaging in agriculture. They are at present confined to an Indian reservation in Colorado, and number about 2,000.

UTICA, an ancient Phoenician city of North Africa, located on the Gulf of Tunis. Though subject to Carthage, it for a long time resisted that authority successfully, and was never contented under Carthaginian rule. In the third Punic War Utica submitted to Rome, and after the fall of Carthage was made the capital of the province of Africa. It was at Utica that Cato killed himself, after Caesar's victory at Thapsus. The Arabs destroyed the city in the seventh century. It was excavated by the French engineer, Daux, in 1869.

UTICA, N. Y., the county seat of Oneida County, ninety-five miles northwest of Albany, on the Mohawk River, and the Erie Canal and on the New York Central, the West Shore, the Delaware & Lackawanna and the New York, Ontario & Western railroads. It is the gateway to the Adirondack region and a center for tourists. It has an elevation of about 500 feet above the sea, and

is laid out with wide streets. The city is famed for its magnificent old elms. Fine state roadways radiate in all directions.

There is a large public library, besides that of the Oneida Historical Society, and law, medical, Y. M. C. A. and Hebrew libraries. The Utica Catholic Academy, Assumption Academy, the New School and a number of other private schools are located here. An unusual number of charitable institutions have caused the place to be called the "City of Charities." They include the Saint Luke's Homeopathic, the Faxon and the general hospitals; a state hospital for the insane; Saint Elizabeth's Hospital and Home; the state Masonic Home and various homes for orphans, aged and homeless. The school buildings of the city are among the best in the state, and the educational standard is high. Other prominent structures are a county courthouse, a state armory and a Federal building.

Utica has good transportation facilities, and is an important commercial and industrial center. It ships large quantities of cheese and other dairy products, roses, fruit, live stock and manufactured goods. The principal manufactures are men's clothing, hosiery and knit goods, cotton and woolen goods, furnaces, machine shop and lumber products, farm implements, paints, fire extinguishers, automobile parts, cutlery and iron pipe.

During the French and Indian War a fort was erected on this site to control the fording place on the Mohawk. It was named in honor of Philip Schuyler. A settlement grew up and was known as Old Fort Schuyler until its incorporation as the village of Utica in 1798. The city was chartered in 1832. Population, in 1910, 74,419; 1920, 94,136, a gain of 27 per cent.

UTILITARIANISM, a term given to that system of ethics and philosophy whose fundamental principle is that the standard of right and wrong is the happiness of mankind; that is, that an act is good only to the extent that it proves itself serviceable in promoting the welfare or happiness of society. This theory is of modern origin, having been first definitely stated by John Stuart Mill and accepted by such later philosophers as Spencer and Sir Leslie Stephen. However, it is the natural outgrowth of the philosophy of such men as Hume, Locke, Bentham and Hobbes. See **PHILOSOPHY**.

UTOPIA, from a Greek word meaning *no place*, is an ideal country where all things are perfect. The term is taken from the title of a political romance written by Sir Thomas More, in 1516, describing the state of society on an imaginary island where all the property belonged to the commonwealth, to which every one contributed by his labor and from which he received his supplies. Its mild penal code was in striking contrast to that which prevailed at that period in England. The people had learned to tolerate diversity of opinion in religious matters. Promotion was according to merit, and the citizens rose through all the gradations of their existence, from form to form, as in a great public school. *Utopia* was published in Latin in 1516, and was later translated into English by Bishop Burnet. It attained a wide popularity, its name furnishing the familiar epithet *Utopian*, which is commonly applied to idealistic projects of reform in religion, government or society.

UTRECHT, *u' trekt*, NETHERLANDS, capital of the province of the same name, situated on the Rhine, where it branches into the Old Rhine and the canalized Vecht. It lies twenty-three miles southeast of Amsterdam, and is the chief railway center of the Netherlands. It is strongly fortified, according to belief prior to 1914, for it was the outpost of defense for Amsterdam. The University of Utrecht, dating from early in the seventeenth century, is located here. Its library contains over 250,000 volumes. The city also has a number of learned societies, a museum of paintings by the old masters and an archiepiscopal museum, which contains a collection of sacred relics. The Gothic Cathedral of Saint Martin, rising in the center of the city, is the most prominent edifice.

The principal industries are the manufacture of carpets, velvets, floor cloths, cottons, linens, cigars, chemicals, musical instruments and machinery. The trade is important. In this city, in 1579, the Union of Utrecht was formed, establishing the Dutch Republic. In 1713 the Peace of Utrecht was concluded here, terminating the War of the Spanish Succession. Population, 1920, 140,189.

UTRECHT, PEACE OF, a series of treaties agreed upon at Utrecht, between the years 1713 and 1715, by the powers that had been engaged in the War of the Spanish Succession. This was the most important political adjustment between the Peace of Westpha-

lia (1648) and the Congress of Vienna (1815).

By its provisions, Austria and Holland on the north, Prussia on the east and Savoy on the southwest were secured from French aggression. A treaty between France and England recognized the Hanoverian line of kings, engaged never to unite the crowns of France and Spain, and ceded to England Nova Scotia, Newfoundland and Hudson Bay and Strait. Gibraltar and Minorca were ceded to England by Spain, which also transferred Naples, Milan, Sardinia and the Spanish Netherlands to France. The Dutch were allowed to garrison eight frontier towns in the Austrian Netherlands as protection against France, and were given important

trade privileges. France surrendered Lorraine and certain cities on the right bank of the Rhine, retaining Alsace, with Strassburg. The Prussian king received confirmation of royal title and the Duke of Savoy was raised to kingly dignity. England received trade concessions which laid the basis of a lucrative slave trade with Spanish America.

It is from the Treaty of Utrecht that England dates its commercial and colonial expansion. See SUCCESSION WARS, subhead *War of the Spanish Succession*.

UZ, in the Old Testament, the scene of the story of Job, a region probably lying east or southeast of Palestine.



V, the twenty-second letter of the English alphabet, was used interchangeably with *u* in Latin, and in English until the seventeenth century. The sound of *v* is always the same, and the letter which is most closely allied to it is *f*, with which it is often interchanged in related languages. In English this close connection of the two letters is shown by the plural of such words as wife, wives; half, halves.

As a Roman numeral, **V** means five; with a line above it, it stand for 5,000.

VACATION SCHOOLS. The long summer vacation for public school pupils, especially in the congested sections of cities where there are no playgrounds, has been found to be anything but beneficial to the children. Many of the large cities now maintain schools in such centers for a portion of the vacation, and these are known as vacation schools. Some of the branches taught are the same as those in the regular course of study, but usually more time is given to industrial training and to recreation. The girls are taught sewing and cooking; the boys, woodwork or some other occupation. Some schools offer work of the regular term for pupils who failed of promotion. In schools having a large number of pupils of foreign parentage, special emphasis is placed upon English. Vacation schools are popular, and usually the number of applicants for admission far exceeds the capacity of the buildings.

VACCINATION, *vak se na'shun*, inoculation with the cowpox—a disease akin to, but much less severe than, smallpox—in order to prevent a person from catching the latter, or to make the attack much less severe. The principle upon which vaccination is based is that if one acquires the disease in a mild form, antitoxins for the cure of the disease will be manufactured in the blood and render that person immune from the attacks of

smallpox for several years. The practice of vaccination was introduced by Edward Jenner, an English physician, and it soon came into common use.

The usual method in vaccination is to make, upon the upper part of the arm, a few scratches across one another, with a clean lancet point. The virus from cowpox eruptions is then rubbed on the skin where the scratches have been made. If the vaccination proves successful, a small inflamed sore appears about the third day and increases in size until the tenth day. On the eighth day the constitutional effects manifest themselves by a slight pain in the part, headache, shivering and loss of appetite. These subside in one or two days. Afterward the fluid in the pustule dries up, and a scab forms, which disappears about the twentieth day, leaving a scar in the skin. Few things have been more definitely proved in medicine than that vaccination is a preventive of smallpox. To secure perfect immunity, repeated vaccinations at intervals of several years are necessary in most cases.

There is no danger in vaccination if pure virus is used and if the wound is kept free from infection. The wise plan is to have the vaccination made by a good physician, who will treat the wound properly and prevent any injurious results.

VACCINE THERAPY, *vak'seen ther'a pi*, a method of medical treatment for combating diseases caused by bacteria. The treatment is based upon the principle that injection into the system of killed bacteria that produce the disease will develop in the blood another sort of bacteria that will destroy the disease-producing bacteria. The vaccines are usually prepared by placing some fluid of the body containing the disease-producing bacteria in some substance in which the bacteria will grow rapidly, then purifying this "cul-

ture" and treating it with a preservative. The vaccine is injected hypodermically, and works in a few hours. This method of treatment is successful in such diseases as carbuncle, ulcers, typhoid fever, tuberculosis and asthma. See **SERUM THERAPY**.

VAC'UUM, a term usually applied to a space from which air or other gases have been exhausted. An absolute vacuum is impossible, since however completely the gases may be exhausted, the space will still be filled with ether (see **ETHER**). However, in the ordinary use of the term, a vacuum is said to be produced when the air is removed from space as completely as possible by means of an air pump. Such vacuums are sufficiently perfect for common experiments. The most perfect vacuum formed in practice is that above the mercury in a barometer tube, produced by filling the tube with mercury and allowing it to settle until the column sustained is equal to the weight of an equal column of atmosphere (see **BAROMETER**). Other practical applications of the vacuum are found in the vacuum brake and the vacuum pan. See **AIR BRAKE**; **VACUUM PAN**.

VACUUM CLEANER, a device for removing dust from floors, walls and hangings by means of rolling brushes and air suction. Small cleaners propelled by hand or capable of being attached for power to electric sockets are in use in individual households. For larger buildings an air pump mounted on a truck and run by a gasoline engine may go from door to door, carrying the dust to a box in the truck by means of a large hose. Office buildings are commonly equipped with stationary engines, run by gasoline or electricity and operating a pump connected with a system of pipes leading to the different floors.

The use of the vacuum cleaner is a distinct advance in the matter of sanitation, as the former method of sweeping with brooms scattered the dust and was a means of spreading contagion.

VALDAI, *val di'*, **HILLS**, a group of hills in West Central Russia, forming the chief watershed of that part of Europe. They consist of hills and plateaus, with an average altitude of from 8,000 to 9,000 feet. Formerly covered with forests, they are now cleared and cultivated. They contain the sources of the Volga, the Dnieper and the Duna.

VALENCIA, *val len'she ah*, **SPAIN**, the third city in population in the country, situ-

ated on the Guadalaviar River, three miles from the Mediterranean. Its history dates to 138 B. C. It was destroyed by Pompey of Rome, and was captured by the Visigoths in 413 and by the Moors in 714. From 1021 to 1238 it was the capital of an independent Moorish kingdom. In its modern aspect it is a picturesque mixture of Moorish architecture and modern streets and plazas. The University of Valencia, founded in 1411, is one of the foremost in Spain. The harbor is secure and well equipped to accommodate commerce and the city is an important railway center. The leading industry is the manufacture of silk, and the place is also noted for the making of colored tiles. Fruit raising is extensively carried on in the surrounding country.

VA'LENS (328-378), Roman emperor of the East, associated in power with his brother Valentinian I. The chief event of Valens' reign was a war with the Goths, who, driven southward by the Huns, had received permission to settle on Roman territory. Irritated, however, by the treatment they received at the hands of the Roman officials, they soon took up arms and destroyed Valens and the greater part of his army.

VAL'ENTINE, **SAINT**, a saint of the Roman calendar, said to have been martyred in A. D. 306. The custom of choosing valentines on his day (February 14) has been accidentally associated with his name. On the eve of Saint Valentine's day, young people of both sexes used to meet, and each of the men drew from a number of names of the opposite sex. Each gentleman thus got a lady for his valentine, and he became the valentine of a lady, to whom he was bound to be faithful for a year. A similar custom prevailed in the Roman Lupercalia, to which the modern custom has, with probability, been traced. The day is now celebrated by sending through the post, sentimental or ludicrous missives, specially prepared for the purpose.

VALENTIN'IAN I (321-375), on the death of Jovian, in 364, chosen emperor of Rome by the army, therefore one of the "barracks emperors." He shared the empire with his brother Valens, who ruled in the East. Although chiefly occupied throughout his reign in repelling invasions of the barbarians, he proved himself a firm and just ruler, instituting many political and social reforms. His sons, Gratianus and Valentinian II, succeeded him.

VALENTINIAN III, Roman emperor from 425 to 455. He was made emperor by Theodosius II, his grandfather, but never really exercised the imperial power, leaving it in the hands of his mother, Placidia, until her death in 450, and then largely in the hands of the eunuch Heraclius. Although the barbarians who were constantly harassing the empire were repeatedly defeated by Aëtius, general of the army, Spain, Africa, Gaul and other provinces were lost to Rome during Valentinian's reign, and the empire grew steadily weaker. Valentinian was assassinated.

VALE'RIAN, a medicinal plant, native to Europe and Northern Asia, growing abundantly by the sides of rivers and in ditches and moist weeds. The aromatic, volatile oil obtained from its roots is used as a stimulant in the treatment of nervous and circulatory disorders.

VALHAL'LA, in Old Norse mythology, the palace of immortality, inhabited by the souls of heroes slain in battle, and carried hither by the swift Valkyries. Here they spent their time in drinking and feasting and fighting furious battles; their wounds, though often serious, were healed every night. The name Valhalla is applied figuratively to any edifice which is the final resting place of many heroes. See VALKYRIES.

VALKYRIES, *val kir'eez*, in Old Norse mythology, the maiden attendants of Odin, who, at his command, rode over battlefields and bore the souls of the bravest of the slain to Valhalla, Odin's great hall. Here the Valkyries waited upon the heroes, serving them mead in vessels made from skulls. The Valkyries were sometimes regarded as the personification of clouds, especially of storm clouds. See VALHALLA.

VALLADOLID, *vahl ya do leed'*, MEXICO. See MORELIA, MEXICO.

VALLEJO, *val ya'ho*, CALIF., a city of Solano County, situated on the northeastern shore of San Pablo Bay, twenty-three miles northeast of San Francisco, on the Southern Pacific railroad. It has a fine, deep harbor, which admits the largest ocean ships, and is an important shipping point for grain. Its leading establishment is the Mare Island Navy Yard. There are also flour mills and tanning yards. The city is built on the slopes of a hill, and the surrounding country is devoted to the raising of fruit. The public institutions include an orphans' home, Saint

Vincent's Academy, a sailors' clubhouse, a Carnegie Library and a city hall. The city was founded in 1851 with the intention of making it the capital of the state. The legislature met here in 1851, in 1852 and for a time in 1853. The commission form of government was adopted in 1911. Population, 1910, 11,340; in 1920, 16,853, a gain of 49 per cent.

VAL'LEY, low land between mountains, hills or bluffs. The largest and most important valleys have been formed by the upheaval and folding of the earth's crust. Such valleys are found among mountain systems, and are called *intermontane* valleys. They are long and narrow, and their floor may have an elevation several hundred or several thousand feet above the sea level. The simplest valleys of this sort are found in the Jura Mountains, where the strata were not broken in folding and where the slopes are remarkably uniform and even. Many of the so-called basins in the Rocky Mountain plateau are also valleys formed by the folding of strata, but most of these are irregular and are caused by transverse ranges, show-



A VALKYRIE

ing that the movements by which they were formed were very complex.

Valleys running parallel to the mountain ranges are known as *longitudinal* valleys, those running across the ranges are *trans-*

verse valleys. Transverse valleys may be due to breaks in the folded strata, but most of them have been formed by erosion. They are usually narrow, with very steep sides, and the floor is only wide enough for the stream which flows in it. When of high altitude these valleys are known as *passes*. Among the most celebrated of these passes are the Kabul Pass in the Himalayas and the Simplon Pass. When of low altitude, transverse valleys are frequently known as *water gaps*, as the Delaware Water Gap.

Valleys in volcanic regions are usually due to volcanic action and are found in the side or on the summit of mountains, around the crater. They are small and of comparatively little importance. *River* valleys are formed by erosion, but their location was first determined by the formation of mountains and valleys by folding. Glacial valleys are those which have been formed or modified by the action of glaciers. They are found in mountainous regions, and most of them were undoubtedly river gorges, previous to the glacial period. The lochs and firths of Scotland are good illustrations.

Drowned valleys are those partially under the sea, and are formed by the lowering of the coast. The fiords of Norway, Delaware Bay and the Gulf of Saint Lawrence are good examples.

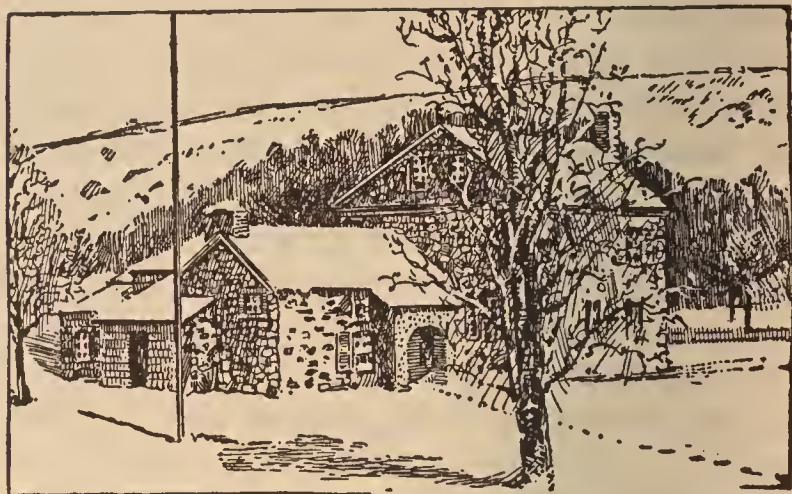
Related Articles. Consult the following titles for additional information:

| | |
|--------|----------|
| Canyon | Glaciers |
| Fiord | Mountain |

VALLEYFIELD, QUE., on the Canadian National and the Saint Lawrence & Adirondacks railways, is the western terminus of the Beauharnois Canal. The town has large cotton and flour mills, paper, biscuit, gasoline motor, glove, clothing and cigar factories. It is the seat of a Roman Catholic bishop. Considerable lumbering and iron mining are done in the vicinity. Population, 1921 9,215.

VALLEY FORGE, a village in Chester County, Pa., famous as the site of the quarters of the American colonial army under George Washington in the winter of 1777 and 1778. The army was 11,000 strong when it went into camp, December 17, but owing to mismanagement on the part of the quartermaster-general and the commissary department the supplies were totally inadequate, and fully half the men were soon unfit for duty. The suffering of the soldiers during the winter and following spring was almost incredible and tried the patriotism of even the most loyal

friends of the colonial cause. Washington remained with his men throughout this period and with the aid of Baron Steuben finally



WASHINGTON'S HEADQUARTERS AT
VALLEY FORGE

succeeded in bringing the army to a high state of efficiency. Camp was broken June 18, 1778. The site is now partially included in a tract preserved by the state and known as Valley Forge Park.

VALOIS, *val wah'*, a dynasty ruling in France from 1328 to 1589, having its origin in the circumstances by which Philip III, in 1285, gave the county of Valois to his younger son, Charles. Upon the extinction of the Capet dynasty, in 1328, the eldest son of this Charles of Valois ascended the French throne as Philip VI. The elevation of the House of Valois to the throne of France gave rise to the series of long and bloody conflicts with England known as the Hundred Years' War.

VALPARAISO, *val pa ri'zo*, CHILE, the capital of the province of Valparaiso and the chief port of the country, situated on the Pacific Ocean, sixty-eight miles northwest of Santiago. It has a commodious harbor, protected by a newly-constructed breakwater, and is connected by regular lines of steamers with leading American and European ports. It is strongly fortified, and has a large naval arsenal.

Back of the harbor rise hills and mountains, on the lower slopes of which is the newer residence portion of the city. The lower town contains the business section and city park. The buildings are mostly constructed of stone and are of a substantial character. The educational institutions include a naval school, a number of colleges and a school for marines. The city maintains a hydrographic bureau and a museum of natural history. The industrial establishments include foundries, machine shops, bottling works, distilleries, sugar refineries and rail-

road shops. The principal exports are grain, wool, leather, guano, saltpetre and copper; the imports are textile and other manufactured and mineral products.

Valparaiso was founded by Juan de Saavedra in 1536. It has been visited by several disastrous earthquakes, the latest being that of August 16 and 17, 1906, which destroyed a large part of the city, killed more than a thousand persons and rendered at least 75,000 homeless. Population, 1920, 182,242.

VALPARAISO UNIVERSITY, an educational institution at Valparaiso, Ind., founded in 1873 for the purpose of securing university advantages for students of limited means. There are no entrance requirements, and tuition and boarding fees are below the average. There are between twenty-five and thirty departments, offering general and professional courses. In normal years about 6,000 students are in attendance, and the faculty numbers over 200. The library contains about 17,000 volumes. Valparaiso University is coeducational and nonsectarian. It has law and medical departments in Chicago.

VALUE. See SUPPLY AND DEMAND.

VALVE, a device, as a cap, ball or slide, for the purpose of controlling the flow of liquids, steam, gas or loose material through pipes, tubes or chutes. As to the method of their operation, most valves may be included in this general classification: (1) valves opened and closed by hand; (2) those operated by independent mechanism; (3) those operated by mechanisms connected with the machine whose operation they control; and (4) those opened and closed by the motion of the fluid whose flow they control. Valves may rotate, rise and fall from their seats or open and close by sliding on and parallel to their seats. In the human anatomy the loose flap or fold of lining membrane which regulates the flow of the blood and other bodily fluids is called a valve. See PUMP; STEAM ENGINE.

VAMPIRE, in Slavic folklore, a corpse which leaves its grave during the night and sucks the blood of living human beings, particularly of young people and children. The victims gradually lose strength and finally die from no apparent malady, while the corpse retains the appearance of a living being. The belief in vampires is an ancient one, fostered by the medieval Greek church as a means of terrifying the people into

godly behavior. It still persists in the locality of the lower Danube, where heretics, outcasts and criminals are still supposed to become vampires at death.

Figuratively, a vampire is a person who in any way preys on another. Kipling's poem, *The Vampire*, characterizes the parasitic woman.

VAMPIRE BAT, a Central and South American bat which takes its name from the habit of some of the species of sucking the blood of the cows, horses, and even men, attacking them in their sleep. These bats are of small size, are tailless, and have a pair of upper incisors elongated and sharpened to pierce the skin of their victims. They have gullets so small that only a liquid diet is possible, and the intestinal canal is modified to accommodate a diet of blood. The destructive qualities of these bats, however, have been greatly exaggerated.

VANA'DIUM, a silvery-white metallic element, extracted by difficult processes from a number of minerals. It is of value as an alloy in the manufacture of steel, especially that used in automobile construction, because it increases elasticity and tensile strength. Certain vanadium salts yield compounds that produce intense, permanently black pigments that are combined with aniline in the manufacture of dyes and also as the basis of black writing fluids.



VAN BUREN, MARTIN (1782-1862), an American statesman, eighth President of the United States. He was the close friend and the successor of Andrew Jackson, to whom he owed his nomination by the Democrats. Van Buren was totally unlike his imperious, outspoken predecessor. He was slight of figure, courteous, mellow-voiced and soft-spoken, yet beneath his placidity of manner there lay individuality, a firm will and strength of character. Tactful and conciliating as he was, Van Buren could fight doggedly for principle, and notwithstanding his strong sense of party loyalty, he could break with his party when his conscience so dictated. His administration is noteworthy chiefly for the establishment of the independ-

ent treasury system, the result of his own tireless efforts. At the time he gained little credit for this achievement, but historians of to-day find this the outstanding feature of his career as President.

Early Life. Martin Van Buren was born at Kinderhook, Columbia County, New York, on December 5, 1782. He was the son of a small farmer. He attended the local schools until he was fourteen, after which he became office boy for a neighborhood lawyer, rising to the positions of clerk, copyist of pleas and special pleader in the constables' courts. After six years of such training he entered a New York law office, and in 1803 was admitted to the bar. He then entered into a partnership with his half brother, James Van Allen, in Kinderhook, where he was soon a conspicuous figure in local Democratic (then called Democratic-Republican) politics. Within the next few years Van Buren advanced rapidly in his profession, becoming probate judge in Columbia County, in 1808, and holding that position until 1813.

Political Advancement. In 1812 Van Buren was elected to the state senate of New York, and in 1815, while still a member of that body, was appointed attorney-general. He was reelected to the senate for the term 1816-1820, but lost his position as attorney-general in 1819 because of a political disagreement with Governor De Witt Clinton. Throughout this period he was steadily gaining in power of leadership, and in 1820 was successful in securing the reelection of Rufus King to the United States Senate. The following year he himself won a seat in that body.

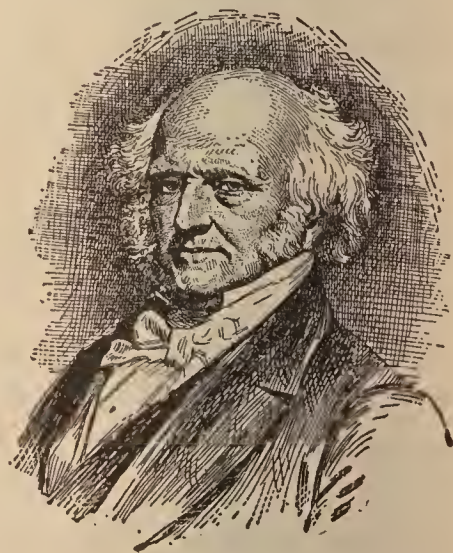
Van Buren remained in the Senate until 1828, when he was elected governor of New York. In the Senate he had favored strict construction of the Constitution on all questions, and as a member of the finance committee and chairman of the judiciary committee he had made a good impression by his sincerity and moderation. His career as governor is of special interest to-day, in that he advocated two principles whose wisdom is more appreciated at present than in his time. In the first place he opposed free banking, and advocated a system whereby all the state banks would become "mutual insurers of each other's soundness." This plan is a feature of the present Federal Reserve system. Secondly, he recommended that state and national elections be separated.

While this principle has not been extensively adopted, its soundness is generally accepted.

In the Presidential election of 1828, Van Buren effectively supported Andrew Jackson, whom he warmly admired, and in 1829 the latter rewarded him with the most important place in his first Cabinet, that of Secretary of State. Van Buren retained this office long enough to settle a disagreement between England and the United States with respect to the trade of the West Indies.

He resigned in 1831 and soon accepted the post of minister to England, but as a bit of party politics the Senate Whigs succeeded in holding up the nomination after the appointee had sailed. It was known in political circles that Van Buren had resigned in order not to jeopardize his chances for the Presidential nomination in 1836, to which he was looking forward. The Whigs hoped to discredit him by their maneuver, but the pretext which they used was so feeble that their act served only to increase Van Buren's popularity. In 1832 he was elected Vice-President on the ticket with Jackson, and was in line for the nomination for President on the expiration of Jackson's second term. The Whigs were badly split, and in the electoral college in 1836 the party vote was divided among William Henry Harrison, Hugh L. White of Tennessee, Daniel Webster and W. P. Mangum of South Carolina. Van Buren had 170 votes against seventy-three for his nearest rival, Harrison.

Administration. The new President fell heir to a legacy of financial chaos, and his whole administration was clouded by that issue. President Jackson, in 1833, had removed the funds of the government from the United States Bank, practically putting an end to the institution, which he regarded as a symbol of the "money power." The funds had been distributed among certain "pet banks," which used them in unsound speculation. Subsequently, Jackson issued a "specie circular" requiring that gold and



MARTIN VAN BUREN

Administration of Martin Van Buren, 1837-1841

I. THE PRESIDENT

- (1) Birth
- (2) Education
- (3) Early career
- (4) Later life
- (5) Character
- (6) Death

II. THE PANIC OF 1837

- (1) Causes
 - (a) Over-speculation in land
 - (b) Expenditures for internal improvements
 - (c) Panic in England
 - (d) Failure of the wheat crop
 - (e) Wild-cat banking
- (2) Effects
 - (a) High prices of necessities
 - (b) Bank and brokerage failures
 - (c) Business failures
 - (d) Distress among the poor
 - (e) Suspension of specie payments
- (3) Led to independent treasury

III. DOMESTIC AFFAIRS

- (1) Slavery agitation
 - (a) Riots and demonstrations
 - (1) Murder of Lovejoy
 - (2) Garrison mobbed in Boston
- (2) Second Seminole War
 - (a) Skirmishes and raids
 - (b) Capture of Osceola and other chiefs
 - (c) Zachary Taylor's force defeats Indians at Okechobee swamp
- (3) Oregon settlements
 - (a) Mostly by Hudson Bay Company
 - (b) Americans were missionaries
- (4) The Mormons in Missouri
 - (a) Control of the government by the Mormon church
 - (b) Troubles at Kirtland
 - (c) Driven out of Missouri
- (5) Riots and disorder
 - (a) The "buckshot" war
 - (b) The "broad seal" war

- (c) Anti-rent or "patroon" war
- (d) Canadian rebellion
 - (1) Attempts to enlist American aid
 - (2) Strict neutrality of the United States
 - (3) The Caroline affair
- (6) Great inventions and discoveries
 - (a) Friction matches, 1838
 - (b) Magnetic telegraph
 - (c) First photograph taken
 - (d) Vulcanized rubber

IV. QUARREL WITH MEXICO

- (1) Causes
 - (a) Property of Americans in danger
 - (b) United States vessels seized
 - (c) United States citizens imprisoned and executed
- (2) Mexico resented recognition of Texan independence

V. ELECTION OF 1840

- (1) Issues
- (2) Candidates

Questions on Van Buren

When was Martin Van Buren born? In what state?

What profession did he adopt?

What public offices did he hold before 1837?

What can you say of his abilities and character?

What were the principal causes of the panic of 1837? Give details of each as far as you can.

What were some of the immediate effects of the panic?

What is meant by the independent treasury or subtreasury system?

Who was Elijah Lovejoy? Where did he live?

Give a brief summary of the career of William Lloyd Garrison.

What future President took a prominent part in the second Seminole War?

Who was the founder of the Mormon sect?

Name three inventions perfected during Van Buren's administration.

VAN BUREN'S ADVERTISER

1837-1841.



THE ALTON RIOTS
1837.

MAGNETIC TELEGRAPH
PATENTED-1837-



THE
CANADIAN REBELLION
1837.

CHEROKEE INDIANS
REMOVED TO INDIAN TERRITORY
1838.

THE GREAT
FINANCIAL PANIC
... OF 1837 ...
THE
SUBTREASURY SYSTEM
ESTABLISHED.

SUBTREASURY BILL PASSED
1840.

6th CENSUS-POPULATION,
17,069,453
1840.



FIRST PHOTOGRAPH
TAKEN IN AMERICA...
1839.



FIRST NORMAL SCHOOL
OPENED IN MASS.
1839.

PROCESS OF
VULCANIZING RUBBER
DISCOVERED IN
1839.



FRICTION MATCHES
FIRST USED IN 1838.



THE
SEMINOLE
WAR.



VICTORIA CROWNED

silver be paid for public lands, which drained the banks of their reserves and caused many failures. It was a period of credit inflation, reckless issuance of paper money and extravagant expenditures for public improvements, and in 1837, shortly after Van Buren began his term, a disastrous panic overwhelmed the nation.

The President called Congress in special session, and in his first message, September 1, 1837, outlined his policy. After explaining the causes of the panic, he presented his plan for an independent treasury, whereby the control of national finances would be divorced from private banking and the government would be the custodian of its own funds, as it is to-day. For three years he labored to have this policy adopted; not until July, 1840, did he succeed in persuading a reluctant Congress to pass the law which he regarded as a sort of "second Declaration of Independence." Except for a short interval under the Whig régime, the independent treasury has remained a permanent national institution.

Though the financial issue overshadowed all others, it is not true that Van Buren's term was in other respects uneventful. The slavery issue, becoming yearly more entangled with politics, was the cause of such disturbances as the murder of Elijah Lovejoy at Alton, Ill., and the mobbing of the great abolitionist, William Lloyd Garrison. There were outbreaks in New York against the landlords, or patroons, and in Missouri against the Mormons; in Florida a desperate war with the Seminoles was waged. A rebellion in Canada and the establishment of the republic of Texas caused disturbances along the international boundaries, north and south.

Van Buren was not responsible for these conditions, but they reacted against him, and with the prevalent hard times served to make his administration and the Democratic party extremely unpopular. He also alienated many voters by refusing to aid the Canadian rebels, though time has vindicated his attitude of strict neutrality. Considerable material progress is recorded of the period. In 1837 the magnetic telegraph was invented; friction matches were first used in 1838; in 1839 the first photograph was taken in America. In 1839, too, the process of vulcanizing rubber was invented by Charles Goodyear.

Van Buren was a candidate for reelection,

but his administration was connected with too much that was disagreeable, and he was defeated. He secured but sixty electoral votes, to 234 for the Whig candidate, William Henry Harrison. Calmly accepting his defeat, he retired to his country seat of Lindenswald in his native county.

As Ex-President. Van Buren by no means disappeared from the public eye during the last two decades of his life. In 1844 he took a firm stand against the annexation of Texas, thus losing the Democratic nomination for the Presidency, and within the next three years he came out definitely against the extension of slavery. In 1848 the faction of the Democratic party which upheld the Wilmot Proviso (which see) nominated him, against his wishes, for the Presidency, and the nomination was confirmed by a convention of "Free-Soilers." The regular Democrats nominated Lewis Cass, from whom Van Buren pulled enough votes to give the election to Zachary Taylor. Van Buren received about 300,000 popular votes, but he carried no state. He remained a Democrat to the end of his life, but his sympathy for the anti-slavery cause made him a firm supporter of Lincoln after the outbreak of the Civil War. He died in the second year of the struggle, and was buried at Kinderhook, N. Y.

Related Articles. Consult the following titles for additional information:

| | |
|--|---------------------|
| Garrison, William | Seminole |
| Lloyd | Texas (history) |
| Lovejoy, Elijah P. | Treasury Department |
| Political Parties in the United States | |

VANCOUVER, *van koo'ver*, B. C., the fourth largest city of Canada and the metropolis of the province, is situated on Burrard Inlet, an arm of the Strait of Georgia. Vancouver is the western terminus of the Canadian Pacific Railway, and it was laid out by that railway corporation in 1885. It is now also the terminus of two other great trans-continental railway systems, the Canadian National Railways, and the Pacific Great Eastern. It is also the western terminus of the British Columbia Electric Railway, which extends to Chilliwack and New Westminster. The city is on one of the best harbors in the world, and has regular steamship connection with China, Japan and other ports of the Orient. It also has a coastwise trade with Alaska and the Pacific ports of the United States.

The prominent buildings include the Bank of Montreal, the Canadian Bank of Commerce, the Merchants' Bank, the customhouse, public library and courthouse. The University of British Columbia, the leading



THE PUBLIC BUILDING, VANCOUVER.

educational institution of the province, is located here. Stanley and English parks, the former having an area of 600 acres, add much to the beauty of the city.

Vancouver is the nearest North American port to the Orient, and it has a large wholesale trade exceeding \$50,000,000 a year. It is also an important manufacturing center. The principal manufactures include lumber and lumber products, structural steel, wooden and steel ships, furniture, machinery and refined sugar. Population, 1911, 100,401; in 1921, 117,217.

VANCOUVER, GEORGE (1758-1798), an explorer and discoverer. He accompanied Cook on several of his voyages, and later was in command of an expedition to explore Australia and New Zealand. From there he sailed by way of the Hawaiian Islands to North America, where he surveyed, in a period of two years, the coast from 35° to 56° North latitude. Vancouver Island was named after him. He sailed for England via Cape Horn and Saint Helena, and died shortly after his arrival at his home in Surrey.

VANCOUVER, WASH., the county seat of Clarke County, five miles north of Portland, Ore., on the Columbia River and on the Northern Pacific, the Great Northern, the Oregon-Washington Railway & Navigation Company, and the Spokane, Portland & Seattle railroads. It is the United States military headquarters for the department of Columbia. Vancouver lies in a section of large forests and farming lands. The leading industrial plants include a saw mill, a flour mill, an ice plant, a creamery, a cannery, car-repair shops, brickyards, box factories and fruit-packing plants. The state schools for the blind and the deaf and Saint Joseph's Hospital are located here. Notable buildings are a Carnegie Library, the United States National Bank Building, and a courthouse and postoffice. A new Interstate bridge spans the Columbia River at this point. Vancouver was first settled as a post of the Hudson's Bay Company in 1828, and was incorporated as a city in 1858. Population, 1910, 9,300; in 1920, 12,637, a gain of 36 per cent.

VANCOUVER ISLAND, an island in the Pacific Ocean, off the coast of British Columbia, of which it is politically a part. It is separated from the mainland of Canada by the Gulf of Georgia and Queen Charlotte Sound and from the United States by the Strait of Juan de Fuca. Its length is 275 miles; its greatest breadth, sixty-five miles; and its area, about 12,000 square miles. The island is generally mountainous, being a continuation of the Coast Ranges formation. It has a mild, moist climate, and in the south and east its soil is fertile and well suited to agriculture and fruit growing. The mountains are generally covered with heavy coniferous and deciduous forests. The interior is well adapted to grazing, and large numbers of horses, cattle, sheep and swine are raised. Fishing interests along the shores of the streams and lakes are of considerable importance. Mineral resources include coal, gold and copper. The coal mines are extensively worked and supply the greater part of the coal used on the Pacific coast. The chief town is Victoria, the capital of British Columbia. The island was visited by Vancouver, an officer of the British navy, in 1792, and was named for him. The United States claimed it, but when the Oregon boundary question was settled in 1846, it became a possession of Great Britain.

VAN'DALS, an ancient Teutonic people, inhabiting the region between the Vistula and the Oder, whence they moved southward and settled in Pannonia, becoming Christians of the Arian faith. At the beginning of the fifth century they entered Gaul and crossed the Pyrenees into Spain. One section settled in Galicia and were almost entirely destroyed in a struggle with the Goths and Suevi; the other settled in a part of Baetica, which received from them the name *Andalusia*. In 429 they crossed the Strait of Gibraltar, under their dreaded leader, Genseric, carrying devastation and ruin from the shores of the Atlantic to the frontiers of Cyrene. In 455 Genseric and his soldiers sacked Rome, plundering and ruining temples, beautiful buildings and works of art. The word *vandal* is still applied to persons who are wilfully destructive.

VAN'DERBILT, CORNELIUS (1794-1877), American capitalist and financier, born on Staten Island, N. Y.

At the age of sixteen he bought a boat and ferried passengers and goods across to the city. Gradually extending his enterprise, by the age of forty he had become the owner of a fleet of sound and river steamers running to Boston and up the Hudson. In 1849 he founded a steamship



CORNELIUS
VANDERBILT

and transfer line by way of Lake Nicaragua to California, and during the Crimean War he established a line of ocean steamships to Havre. Because of the large fleet of boats he owned he was popularly known as "Commodore." Later he transferred his capital from steamships to railroads, obtaining a controlling interest in a large number of Eastern roads, and extending his system to Chicago by securing the Lake Shore & Michigan Southern, the Canada Southern and Michigan Central roads. At his death he left a fortune of \$100,000,000 to his son, William Henry Vanderbilt. His philanthropies included a gift of a million dollars for the founding of Vanderbilt University.

VANDERBILT, CORNELIUS (1843-1899), son of William Henry Vanderbilt, made first vice-president of the New York Central Rail-

road when his father succeeded to its presidency, on the death of his grandfather, Cornelius Vanderbilt, in 1877. He subsequently held directorships in more than thirty different railroad companies. He was a contributor to many educational institutions, including Vanderbilt and Yale Universities. The prized treasure of the Metropolitan Museum, New York, Rosa Bonheur's *Horse Fair*, was the gift of Cornelius Vanderbilt.

VANDERBILT, WILLIAM HENRY (1821-1885), son of "Commodore" Vanderbilt and his successor in the management of the Vanderbilt system of railroads, which he extended till he controlled the Michigan Central, the Lake Shore & Michigan Southern, the Canada Southern, the Chicago & North Western, the Nickel Plate and the West Shore railroad. He was considered one of the greatest authorities on transportation of his day. He gave large sums to Vanderbilt University and Columbia University.

VANDERBILT, WILLIAM KISSAM (1849-1920), son of William Henry Vanderbilt, entrusted by his father with the management of numerous responsible offices connected with the New York Central Railroad and a director in fourteen different lines. With his brother, Frederick William and George Washington Vanderbilt, he founded the Vanderbilt Clinic in New York City, and erected Kissam Hall at Vanderbilt University, in memory of their mother.

VANDERBILT UNIVERSITY, a coeducational institution, established at Nashville, Tenn., in 1872, under the auspices of the Methodist Episcopal Church, and named in honor of Cornelius Vanderbilt, who gave \$1,000,000 for the purpose of establishing the school. According to its present organization, however, the university is not under sectarian management. There are maintained a college of arts and sciences, and schools of law, religion, medicine, dentistry, pharmacy and engineering. Vanderbilt University has been a strong influence in the South in keeping educational standards high. It has a student enrollment of over 1200 and a faculty of about 165. There are 80,000 volumes in the library. The university has received generous gifts from the Vanderbilt family and from Andrew Carnegie.

VAN DYCK, or **VANDYKE**, *van dike'*, ANTHONY, Sir (1599-1641), next to Rubens his teacher, the most famous portrait painter of the Flemish school. He was born at Ant-

werp, where his father was a merchant and his mother a skilled worker in tapestry. He studied under Van Balen and Rubens and also in Genoa, Venice and Rome. Having acquired a great reputation in Antwerp as a fashionable portrait painter, he was invited to England by Charles I, who bestowed upon him knighthood and a considerable annuity. While in England he painted more than 300 portraits, his patrons including almost every distinguished person of the court. His portraits are characterized by delicacy and refinement. Those best known are *Portrait of Charles I* and *Children of Charles I* and the *Portrait of a Lady and Child*. He also painted a number of historical and mythological subjects, and his *Elevation of the Cross* and *Crucifixion* are well known. He married Mary Ruthven of the English nobility, and lies buried in Saint Paul's, London.

VAN DYKE, HENRY (1852-), American poet, essayist and educator. He was born at Germantown, Pa., and graduated at Princeton and at Princeton Theological Seminary. In 1878 he became pastor of the United Congregational Church of Newport, R. I., and five years later was called to the Brick Presbyterian Church of New York. Here he re-



HENRY VAN DYKE

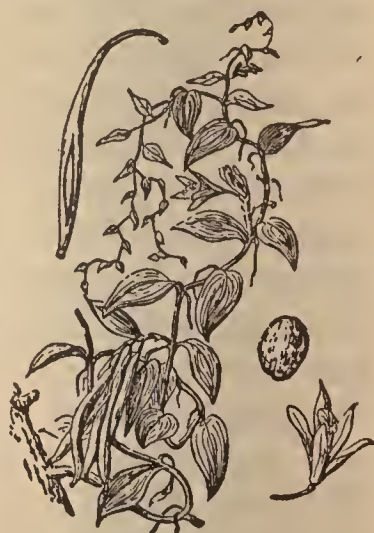
mained as pastor until 1900, when he became professor of English literature in Princeton University. Van Dyke has written extensively, and always attractively, in various fields. *The Builders and Other Poems* and *Music and Other Poems* are among his volumes of poetry. *The Gospel for an Age of Doubt* and *Sermons to Young Men* are examples of his religious work; *The Blue Flower* and *The Ruling Passion* are some of his charming works of fiction, and *Fisherman's Luck* and *Little Rivers* include his best work in the field of essays. In 1913 Dr. Van Dyke was appointed minister to the Netherlands by President Wilson, a position which he held with honor throughout the greater part of the World War. This post he resigned in 1917 before the United States entered the war. After America became a belligerent he was appointed supervisory chaplain in the navy.

VAN HISE', CHARLES RICHARD (1857-1918), an American geologist and educator, born at Fulton, Wisconsin, educated in the University of Wisconsin. Soon after graduation he became connected with the faculty of his alma mater, serving successively as instructor in chemistry, assistant professor of mineralogy, professor of geology and president of the university, to which position he was elevated in 1903. Under his administration the institution became one of the most progressive and useful schools in the United States. He was particularly effective in making extension courses available to all classes of people throughout the state.

Professor Van Hise was made a member of the United States Geological Survey in 1883. He won recognition as the highest authority on rocks of the Algonkian and Archaean Systems and especially on the ore-bearing rocks of the Lake Superior region. He was the author of a series of books on geological subjects and of *The Conservation of Natural Resources in the United States*.

VAN HORNE, WILLIAM CORNELIUS, Sir (1843-1915), railway official and expert, best known for his connection with the Canadian Pacific Railway, which was completed under his energetic and efficient management. He served that railway from 1882 to 1910 as general manager, vice-president, president and chairman of the board of directors, successively. Van Horne was born in the United States and served several mid-western railroads in that country before being called to Canada.

VANIL'LA, a genus of plants belonging to the orchid family, source of the well-known vanilla of commerce. The plants are common in Mexico, and are also found in Central and South America and the East Indies. The vanilla plant climbs by means of aerial roots and has large white, red or greenish flowers. The fruit is a long, brown, shiny bean, filled with a dark, oily, odorous pulp. This bean is gathered before it is fully ripe, and the oil is extracted by a slow process which brings out its peculiar odor and flavor. Vanilla is used in medicine as a



VANILLA

stimulant, but its chief use is in the preparation of liquors and perfumery and in flavoring candy and other confections. The vanilla plant is propagated by cuttings, produces a crop every three years and continues bearing for thirty or forty years. Vanilla is produced artificially by several methods; and as the beans are very expensive, the artificial product is very common.

VAN RENSSELAER, *vahn ren' se lahr*, STEPHEN (1764–1839), an American politician, the eighth “patroon” of the vast estate near Albany, now forming three entire counties, which was first acquired by Killian Van Rensselaer (1595–1644). He was born in New York and educated at Harvard. In 1783 he married a daughter of General Philip Schuyler. He was a leader of the Federalists in his state and served in the state senate and assembly, and in Congress from 1823 to 1829. He was a moving spirit in the construction of the Erie and Champlain canals and was president of their boards from 1811 till their completion, in 1825. In 1824 he founded at Troy the Rensselaer Polytechnic Institute.

VA'POR, in physics, the gaseous state into which solids and liquids pass when heated. In their structure and physical properties, there is practically no difference between vapors and gases (see GAS), but in ordinary usage the term *vapor* is applied to those gases that are formed by the action of heat on liquids and solids, while the term *gas* is applied to those substances which remain in gaseous form under ordinary conditions of temperature and pressure. We speak of steam as a vapor and of oxygen as a gas. Water vapor formed by the action of the heat of the sun on the surface of the land is always present in the atmosphere and has an important effect on climate. See RAIN.

VARICOSE, *var e kose'*, **VEINS**, dilated veins, which are marked by knotty swellings at the valves. The disease commonly affects the lower limbs and sometimes becomes very painful and even dangerous, from the bursting of the veins, though it often is merely an inconvenience. Rest and support in an elevated position and the application of proper bandages are elements in the treatment.

VARI'ETY, in plant and animal classification, a subdivision of a species, including an individual or group of individuals differing in some nonessential way from the

rest of the species. Varieties are believed to result from differences in climate, nourishment, cultivation and the like, and to be less permanent than species.

In naming plants and animals, the name of the variety is placed third, following the name of the species; as *Ranunculus multifidus*, variety, *terrestris*. Here, *Ranunculus multifidus* is the common, yellow, water crow-foot, and the variety *terrestris* is a form growing on the ground.

VA'RIOLOID, a mild form of smallpox, induced by inoculation. See SMALLPOX.

VAR'NISH, a transparent liquid made by dissolving gums in alcohol, turpentine or oil. It is used to form a transparent coat over surfaces to protect them from air and moisture or to make them more beautiful. The resinous substances most commonly employed for varnishes are mastic, lac, copal, amber and asphalt; and the solvents are fixed oil, volatile oil and alcohol. Varnishes are colored with arnotto, gamboge, saffron, dragon's blood and other substances.

The base of varnish is gum copal, or the fossil gum found in Zanzibar, Sierra Leone, New Zealand and the Philippine Islands. The best gum is found in Zanzibar. When the gum is received in the varnish factory, it is broken up into pieces about the size of small egg coal. As it is being broken up, it is selected, for in one chunk of the amberlike material there may be both transparent and almost opaque streaks; the white transparent gum goes into the making of the best grades of varnish, and the dark-colored gum goes into the poorer grades. After the gum copal is broken, it is run through a series of hand sieves, which divide it into block, nut, chip and dust, for convenience in handling. The gum is then ready for the kettle.

For first-class varnish, only Calcutta linseed oil is used. This oil is made from the flaxseed of India. The turpentine used for thinning the varnish is of the best and purest grade. The copper kettles in which the melting and mixing are done are on truck wheels, so that they can be rolled over a fire or taken off easily. The melting gum is constantly stirred. When the oil has been mixed with the liquid gum, the kettle is run back over the fire once more, and the gum and oil are boiled again. Then it is set away to cool, after which a quantity of turpentine is mixed with the gum and oil

and the varnish is made. The varnish is strained through cotton before it is pumped into the storage tanks, where it is left to age for at least six months and often for two years.

Shellac varnish is made in churns, or barrels, revolving on journals. The shellac as it comes from India looks like amber-colored mica, for it is in thin sheets and is almost transparent. This shellac is mixed with the proper amount of alcohol, to dissolve it and form the varnish.

VAS'CO DA GAM'A. See GAMA, VASCO DA.

VASE, a vessel of an ornamental character, generally of pottery but frequently of stone, glass, metal or other materials. Those which have come down to us from ancient times in greatest numbers are the so-called Etruscan vases, made of terra cotta and adorned with painted figures (see ETRURIA, subhead *Etruscan Vases*). The Greek vases of the oldest style come chiefly from Corinth and the islands of Thera and Melos. Those of the late rich style have been almost exclusively discovered in Lower Italy, Apulia and Lucania. They were probably manufactured there, chiefly in the fourth and third centuries B. C.

Italy, France and Germany in the sixteenth and seventeenth centuries produced many vases which are the perfection of artistic form and execution and since the fifteenth century the Venetian vases have been masterpieces of art. From India, China and Japan also have been obtained vases of various materials, especially of porcelain, vying in elegance of form and beauty of ornamentation with those produced in Europe. Of late, some vases have been produced in the potteries of the United States which compare favorably with those made in other lands.

VASELINE, *vas'e lin*, or *vas'e leen*, a product composed of a mixture of paraffines, obtained from petroleum after the hydrocarbons are driven off. It is used as a base for ointments, pomades and cold cream, and is employed for coating surgical instruments and steel surfaces, generally to protect them from rust. See PETROLEUM.

VAS'SAR COLLEGE, one of the leading American colleges for women, founded near Poughkeepsie, N. Y., in 1861, and named in honor of Matthew Vassar, whose generosity made its establishment possible.

He gave 200 acres of land and \$788,000 for the enterprise. The college buildings, which are located on a picturesque elevation not far from the Hudson River, include seven residence halls, Thompson Memorial Library, a museum and an observatory. There is also a farm of 675 acres, on which is maintained a model dairy. Conservatories, flower gardens, an open air theater and athletic grounds are other interesting features. Vassar maintains high standards of scholarship and provides courses leading to the degrees of Bachelor of Arts and Master of Arts. There is a faculty of over 140, and a student enrollment of about 1,100. The library contains over 86,000 books and pamphlets.

Matthew Vassar (1792–1866), founder of the college, was born at Norfolk, England, but was brought to America when four years old. His boyhood was passed near Poughkeepsie, where his father built up a prosperous brewing business. Besides contributing funds to establish the college which bears his name, he gave generously to other causes.

VAT'ICAN, the most extensive palace of modern Rome, residence of the Pope, built upon the Vatican Hill, from which it receives its name. It is a long rectangular edifice, lying north and south, with an irregular cluster of buildings at each end. The present building was begun by Pope Eugenius III (1145–1153) and has been enlarged and embellished by many subsequent Popes. It now possesses twenty courts, and, it is said, 1,100 rooms. Immense treasures are stored in it, including celebrated collections of pictures of many of the great masters, and museums in which all periods of the arts are represented by many of their most perfect productions. Among its noblest art treasures are the frescoes on the ceiling of the Sistine Chapel, painted by Michelangelo, representing scenes and figures connected with sacred history; the frescoes painted by Raphael on the ceilings and walls of certain apartments, known as Raphael's *stanze*, the subjects being biblical and allegorical.

Since the return of the Pope from Avignon in the fourteenth century, the Vatican has been the residence of the pontiffs, and here the conclaves meet for the election of new Popes. Since the unification of Italy and the consequent loss to the Papacy of all political power, the Pope has never gone beyond the Vatican gardens.

The Vatican Library was first constituted by Nicholas V (1447-1455) and was added to and enlarged by Leo X, Pius IV, Pius V and other Popes. The manuscript collections, which are said to contain about 25,600 manuscripts, are priceless. The number of printed volumes has been estimated at from 150,000 to 220,000, including 2,500 fifteenth century editions and a great number of bibliographical rarities.

VATICAN COUNCIL, the Ecumenical Council of the Church of Rome, which met in the Vatican under Pope Pius IX, Dec. 8, 1869, and adjourned July 18, 1870. No council had ever been attended by so large a number of ecclesiastics. It declared the personal infallibility of the Pope, when speaking *ex cathedra*, to be a doctrine of the Church, a declaration yet maintained.

VAUDEVILLE, *vode'vil*, in the French sense, a kind of farcical comedy in which dialogue is interspersed with dancing, comic acting and songs of the day, a name originally given to a popular humorous drinking song, first composed in the valley of *Vau-de-Vire*. In the United States, vaudeville is merely a series of singing, acting and dancing numbers, pretending to no unity and having no relation to the drama.

VAULT, in architecture, a continued arch, or an arched roof, so constructed that the stones, bricks or other materials of which it is composed, sustain and keep one another in place. Vaults may be cylindrical, elliptical, single, double, cross, diagonal or Gothic.

VEDAS, *va'das*, from a Sanskrit word meaning *know*, the oldest sacred writings of India, written in Sanskrit and supposed to have been produced by a series of authors between 1500 and 1000 B. C. The Vedas are four in number, called respectively, the *Rig-Veda*, *Yajur-Veda*, *Sama-Veda* and *Atharva-Veda*. Of these the *Rig-Veda* is the oldest and most important. Its name means *stanzas of praise*, and it consists of more than a thousand hymns, most of them celebrating the deeds and begging the blessing of the greater gods. The other three seem to have been drawn largely from the first one. The latest of the four is sometimes questioned as to authenticity, being concerned rather with superstition than with religion. It reflects the development of the Brahmanical system with its departure from the earlier monotheistic system and its polytheistic rites.

All the Vedas are believed by the Brahmans to be inspired, and are held by them in the highest respect.

VEGA CARPIO, *va'ga kahr'pe o*, FELIX LOPE DE (1562-1635), a dramatic poet of Spain, best known as Lope de Vega, the most prolific imaginative writer in the annals of literature. Born in Madrid, in 1562, he joined the army, and in 1588 accompanied the Invincible Armada on its ill-fated expedition against England. After being twice married and twice a widower, he became a priest and subsequently entered the order of Saint Francis. He had already published various poems, but his dramatic and poetical productions now multiplied with extraordinary rapidity. For many years there was scarcely a week when he did not produce a play, and he himself declared that he often wrote, rehearsed and produced a play in twenty-four hours. He enjoyed an immense popularity and received marks of distinction from the king of Spain and from Pope Urban VIII. About three hundred of his dramatic works have been printed. They reveal an inexhaustible, though ill-regulated, imagination, a strong mixture of the sublime and the ridiculous and extraordinary facility in versification.

VEGETABLE, *vej'e ta b'l*, **IVORY**. See IVORY PALM.

VEGETABLES, in the sense in which the term is generally used, those parts of plants, exclusive of fruits, which are used for food. In some, as the turnip, the roots are the parts used; in others, as the onion, the bulbs. The tubers of the potato and artichoke; the stems of asparagus; the leaves of the lettuce and cabbage; the flower buds of the cauliflower; the green fruit of the cucumber; the ripe fruit of the tomato; the seeds of corn, peas and beans, are common vegetable foods.

The principal components of vegetables are water, protein, fat, nitrogen, starch and certain indigestible refuse, like fiber and ash. The proportions of these constituents vary among different vegetables, but in all, the principal element is water. The amount of water varies from 58.9 per cent, in green beans, to 95.4 per cent, in the cucumber. The per cent of protein varies from .4 per cent, in the watermelon, to 9.4 per cent, in green beans. The amount of fat varies from .1 per cent, in the pumpkin, the radish, the potato, celery and the beet, to 1.1 per cent in

green corn. The amount of nitrogen varies from 2.2, in lettuce, to 26.1, in the sweet potato.

Of fresh vegetables, green shelled beans have the highest fuel value, and the cucumber has the lowest, the value of the latter being about one-ninth that of the former. Others which contain a high fuel value are sweet potatoes, green peas, green corn, sugar peas and parsnips. In the cooking of vegetables, besides the loss of water content, there are chemical changes which often detract materially from the food value. Vegetables form an important part of the diet, because, in addition to their nutritive value, they contain organic acids and other elements essential to the health of the system.

Related Articles. For descriptions of the vegetables in common use consult the following titles:

| | | |
|-------------|--------------|--------------|
| Artichoke | Corn | Pea |
| Asparagus | Cress | Potato |
| Bean | Cucumber | Pumpkin |
| Beet | Eggplant | Radish |
| Brussels | Kohl-rabi | Rhubarb |
| Sprouts | Lentil | Spinach |
| Cabbage | Lettuce | Squash |
| Carrot | Onion | Tomato |
| Cauliflower | Oyster Plant | Turnip |
| Celery | Parsley | Sweet Potato |
| Chard | Parsnip | Yam |
| Chicory | | |

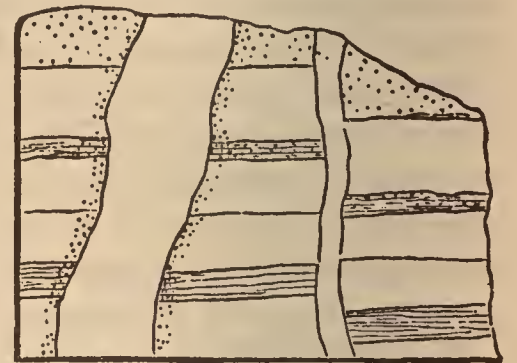
VEGETARIANISM, the belief and practice of subsisting on a vegetable diet to the exclusion of animal food, a doctrine held in ancient times by such men as Pythagoras, Plato and Plutarch and later by Rousseau, Shelley and Swedenborg. At present vegetarian societies exist in considerable numbers in the United States, Canada and several European countries. A vegetable diet, it is claimed, is more healthful, economical and ethically effective than a diet mixed with animal food. Vegetarians differ among themselves, however, as to the degree to which they exclude animal products, some excluding only flesh, others fish and fowl, and others milk, eggs and cheese, as well. While scientific investigations on the whole show the superior efficacy of a mixed diet on the human mechanism, the vegetarians have without doubt done society a service in calling attention to the prevailing custom of eating too much meat.

VEII, *ve'yi*, an ancient Etruscan town, in early times the most formidable rival of Rome. The Romans and the Veientes were constantly at war, and because the latter were uniformly unsuccessful in pitched battle, they adopted the plan of shutting themselves up in the city when the Romans

approached and of going out to plunder when they were safe from attack. The family of Fabius, to whom had been entrusted the defense of Roman territory against the Veientes, were decoyed into ambush and put to death in this manner. About 396 B. C. Camillus took the city, after which it declined to an insignificant village.

VEIN, *vane*, in geology, a formation of igneous rock, occupying a fissure in other rock, as represented by the nearly perpendicular layers in the figure.

They often extend into the earth hundreds of feet. Veins are usually formed by rock in molten condition, forced into



the crevice by pressure, but may also be the result of mineral deposits left by underground waters. They often contain ore deposits, as gold, silver and other metals. Miners call a metal-bearing vein a *lode*. Small veins are often seen in boulders and pebbles, where they can be easily studied. See DIKE; GEOLOGY.

VEINS, a system of canals, or tubes, distributed throughout the bodies of animals, for the purpose of returning the impure blood to the heart and lungs, after it has been carried to the various parts by the arteries. Veins originate in the capillaries as tiny tubes, and as they unite they decrease in number and increase in size, till all those from the head, neck and upper extremities form the *superior vena cava* and those from the other parts of the body form the *inferior vena cava*. Both these large veins empty into the right auricle of the heart. The position of the veins in the circulatory system is shown in the color plate accompanying the article CIRCULATION.

The walls of the veins, like those of the arteries, are composed of three coats, but they are less elastic and have no pulsation. They collapse readily when empty. The distinguishing parts of a vein are the valves, which are made of folds in the internal coat and are arranged in pairs. They lie against the walls when the blood is flowing onward, but if from any cause the flow is obstructed, the valves are forced upward till they meet in the middle of the vein, and so prevent the

blood from flowing backward. The action of the valves may be shown by pressing on some vein near the surface, thus preventing the flow of the blood toward the heart, when the valves will make little elevations in the vein. Valves are not found in the very smallest veins, nor in those of the abdomen, lungs and brain.

The blood flowing from a wounded vein is dark in color and comes out in an even stream. To check the flow, press on the vein below the wound or between it and the extremity.

Related Articles. Consult the following titles for additional information:

| | |
|-------------|-------------|
| Arteries | Circulation |
| Capillaries | Wound |

VELAZQUEZ, or **VELASQUEZ**, *va lahs' kaith*, DON DIEGO RODRIGUEZ DE SILVAY (1599–1660), the greatest master of Spanish painting. He was born at Seville, of Portuguese parents, and studied first under Francisco Herrera the elder, and afterward under Francisco Pacheco. In 1622 he went to Madrid, and as the result of this visit received an appointment as principal painter to Philip IV. Through the advice and intercession of Rubens,



VELAZQUEZ

Velazquez went later to Italy, where he closely studied the works of Michelangelo, Raphael and Titian and the contemporary painters, especially Guido Reni, whose influence is evident to a marked degree in his works. On his return to Spain, in 1631, Velazquez was received with great distinction, and in 1658 the king raised him to the dignity of a noble.

Velazquez' chief characteristic in painting is naturalism. He was never imaginative, but painted exactly what he saw, combining this power of realism with a mastery of light, shade, coloring and composition. Among his finest works are the *Aguador*, or *Water Carrier*; a *Nativity*, or *Adoration of the Shepherds*; the *Brothers of Joseph*; *Moses Taken from the Nile*; portraits of Philip IV and of Elizabeth, his queen, Pope Innocent X and other dignitaries, and many pictures both from history and from common life.

VELOCIPEDE, *ve los'e peed*, a light vehicle or carriage propelled by the feet of its

rider. One of the older forms of this carriage was constructed of two wheels of nearly equal size, placed one before the other and connected by a beam, on which the driver's seat was fixed. The rider, sitting astride the machine, propelled it by the thrust of each foot on the ground. This form dates from the early part of the nineteenth century. It was about half a century later that treadles, operating cranks on the axle of the front wheel, came into use. See **BICYCLE**.

VELOCITY, *ve los'e ty*, the rate at which a body changes its position in space. Velocity is popularly expressed as so many miles per hour or as so many feet per second. The velocity of a body is *uniform*, when it passes through equal spaces in equal times; it is *variable*, when the spaces passed through in equal times are unequal; it is *accelerated*, when during each portion of time it passes through a greater space than during the preceding equal portion; it is *retarded*, when a less space is passed through in each successive portion of time. Linear velocity is speed forward in a straight line; angular velocity is speed about an axis.

VEL'VET, the most familiar of the fabrics woven with a pile, produced by adding to the usual threads of the warp and weft an additional row of warp yarns, woven into the ground of the cloth and passed over wires on the surface. In the case of a loop pile, the wires are drawn out, without cutting, but for velvet or other cut pile, a knife is passed along a groove on the top of each wire before the wire is withdrawn. Real velvet is made entirely of silk. Cotton and woolen goods, woven in this manner, are called *velveteen* and *plush*, respectively.

Some of the richest and most artistic of the textiles woven on Italian looms in the fifteenth and sixteenth centuries were made, in part at least, of velvet. Similar stuffs were also made in Spain and Flanders. Many of these were for ecclesiastical vestments and altar cloths, and for hangings. The effect of a raised pattern in velvet, on a plain or figured silk ground, is very beautiful. Sometimes a design is formed of a long, upon a short, pile, called *velvet upon velvet*, and this, too, has a fine effect. Velvet is believed to have been made first in China.

VELVET LEAF. See **INDIAN MALLOW**.

VENATION, *ve na'shun*, the arrangement of veins in leaves, related to the shape of the leaf and its mode of germination, an im-

portant characteristic in the classification of plants. Most leaves are netted-veined, parallel-veined or fork-veined. The netted-veined are the most numerous, and are divided into several groups. True netted leaves have a single midrib from which branch primary veins terminating in delicate veinlets that curve upward just within the margin of the leaf. If the primary veins extend directly to the edge of the leaf they are said to be feather-veined. For illustrations of venation, see the article LEAVES.

VENDET'TA, an Italian word, taken from the Latin *vindicta*, meaning *revenge*, is a blood feud in which the next of kin assumes responsibility for avenging a murdered person, probably a survival of methods of enforcing justice practiced before the organization of the state and of public courts. In Corsica the vendetta is held to be one of the most binding of family obligations, and the custom is held to a greater or less degree among the Albanians, Druses, Bedouins and other isolated and primitive peoples. The *feuds* among the mountaineers of Eastern Kentucky and Tennessee and Western Virginia in America are analogous to the vendetta.

VENDOME, *vahN'dohm'*, **COLUMN**, 142 feet high, stands in Paris, in the Place de la Vendome. It was built in 1811 by Napoleon's order, was later thrown down by the communists, but the preserved pieces were re-erected on the same spot in 1875. The masonry column is set with 900 feet of bronze, made from 1,200 melted captured cannon, depicting memorable scenes in the Napoleonic campaigns from 1806 to 1810. The Place Vendome was named for the Duke of Vendome, who as a member of a noble house of the old French kingdom served his country in many wars.

VENEER', a thin layer of hard wood, as mahogany, rosewood or maple, glued to the surface of wood of a commoner sort, to give the whole the appearance of being of the more valuable material. It is used for furniture and some interior finishings. Owing to recent improvements in sawing machinery, layers can be obtained that are almost as thin as paper. A good piece of veneer, contrary to popular belief, may be more serviceable than solid wood, for the reason that it is less likely to warp and crack.

VENETIAN, *ve ne'shan*, **SCHOOL OF PAINTING**. See PAINTING.



VENEZUELA, *ven e zwe' la*, a republic of South America, officially known as the UNITED STATES OF VENEZUELA, lying north of Brazil and north and east of Colombia. The coast line, which borders on the Caribbean Sea, has a number of important indentations, the largest being the Gulf of Venezuela and the Gulf of Paria. The country contains twenty-two states, two territories and a Federal district in which the capital is located. Its greatest extent from northeast to southwest is about 925 miles, and from north to south, 725 miles. Having an area of 393,976 square miles, it is the seventh country of South America in area, and is but little smaller than California, Montana and Oregon combined.

The People. By far the largest proportion of the inhabitants are Indians. Among the *mestizos*, or natives, there are many of negro blood. The whites are of Spanish descent; they represent the culture and customs of Spain, and constitute the ruling class. The country is unevenly populated, most of the people living in the agricultural and mountainous regions of the northwest. The interior is largely unexplored and uninhabited. Spanish is the prevailing language. In 1920 the population was estimated at 2,411,952. The Roman Catholic is the leading Church, but all faiths are tolerated.

Education is free and compulsory, but the elementary schools are poor, and the attendance laws are not enforced. In 1918 there were only 50,000 pupils in the elementary schools. There were fifty-eight secondary schools for boys, thirty-eight for girls and six for both sexes. At Caracas, the capital, there is a normal school for men and one for women. There were also thirty-four schools for higher instruction and twenty-one academies. There are universities at Caracas and Merida. There are also military, commercial and other schools in the various cities. But notwithstanding all these institutions and efforts to educate the youth, it is estimated that at least three-fourths of the inhabitants are unable to read and write.

Surface and Drainage. Venezuela is naturally divided into three surface regions. These are the highland region in the northwest, the Guiana highlands in the southeast and the Orinoco valley between. The highland region, in the northwest, is formed by two ranges of the Andes Mountains, one of which extends directly north and south and forms the boundary between Venezuela and Colombia. This range contains some summits with an altitude of 10,000 feet. The other range enters the country near the headwaters of the Orinoco and extends northeasterly to the Gulf of Triest. This range contains the highest land in the country; some of the peaks have an altitude of over 15,000 feet and are capped with perpetual snow. Between these ranges of the Andes is the low depression occupied by Lake Maracaibo, which is directly connected with the sea. The boundary between Venezuela and Brazil is formed by the Parima and Pacarima mountains, which rise to altitudes varying from 6,000 to 11,000 feet. From these ranges the land gradually descends to the basin of the Orinoco. This great interior is divided into the lowlands, along the lower part of the river's course, and the llanos, which lie chiefly north of the river and between it and the Andes. A portion of this region is yet unexplored, but it is supposed to consist of rolling plains and hills, heavily covered with forests.

Venezuela is supposed to have over 1,000 rivers and is perhaps more completely watered than any other country of South America. Chief among these rivers is the Orinoco, flowing through the middle of the country, and its chief tributaries, the Apure, the Meta and the Rio Negro, the last of which is connected with the Amazon by the Cassiquiare. The Orinoco and its chief tributaries, all of which are navigable, furnish an outlet not only for the interior of Venezuela, but for a portion of Columbia as well. There are a number of less important streams flowing into the Caribbean Sea. Of the lakes, Maracaibo, in the northwestern part, is the largest and most important.

Climate. The climate of Venezuela depends upon altitude more than upon latitude. The varying elevations of the country divide it into three climatic regions. The first is the lowland region, which extends from sea level to an altitude of 2,300 feet. This has a hot, tropical climate, with a mean annual

temperature of about 77°. The second is the region of the interior, ranging in altitude from 2,300 to 6,500 feet. This region has a salubrious, temperate climate, with a mean temperature of about 65° and with a comparatively narrow range of temperature, the thermometer seldom rising above 80° or falling below 60°. In the highlands of the mountains is a cold region, which ranges in mean temperature from near freezing point to that of perpetual snow. There are two seasons, the rainy and the dry. During the rainy season the lowlands and most of the interior receive copious rain, in some sections sufficient to flood the country. Along the coast and the lower courses of the rivers the climate is somewhat unhealthful, but the temperate regions of the interior are pleasant and healthful, even to those who are accustomed to temperate latitudes.

Mineral Resources. The country contains large deposits of minerals. Gold is found in the Yuruari territory and is mined to a considerable extent, the annual output in 1918 being 81,327 ounces. Silver mines occur in the central, southern and southwestern parts of the country, while copper and iron are widely distributed. Some tin is also found. Other minerals of importance are sulphur, coal and kaolin. There are a number of salt mines in the country, and they are worked by the government. Petroleum is found in the southwestern part of the country, in the State of Los Andes. There are valuable deposits of asphalt on the island of Trinidad, in the vicinity of Maracaibo and in the State of Bermudez. This is the richest asphalt region in the world. Granite, marble and other building stones are widely distributed over the country. Lack of capital and transportation facilities has thus far prevented the exploitation of the mineral industries of the country.

Agriculture. Agriculture is the chief occupation of the inhabitants. However, only about one-ninth of the surface is under cultivation. The chief crops are coffee, cacao, sugar cane, cereals, fruits, beans, potatoes and other vegetables. Tobacco is successfully cultivated in the lowlands, and the forests furnish valuable products for export, chief among which are copaiba, vanilla and rubber. In general, agriculture is in a backward state. Primitive implements and methods are used, and but poor returns are received for the capital and labor invested. The large areas

of pasture land particularly adapt the country to cattle raising, and this is one of the most important branches of agricultural industry. The country also has large numbers of horses, goats and sheep.

Manufactures. The manufactures are comparatively unimportant and are confined to the larger cities. The chief industries are the manufacture of cotton goods, shoes, hats, carriages, furniture and agricultural implements. The country also has a number of breweries and distilleries. Refrigerating plants for supplying meat for shipment have been established at Puerto Cabello and Baranco, and a cocoanut butter and oil factory has been opened at Cumana. The most important manufacturing industries are exploited by foreign capital and are under foreign management.

Transportation. The interior is reached by the Orinoco and its numerous navigable tributaries. Roads are few and poor, except in the vicinity of large cities, but they are being rapidly improved. Caracas is joined with its seaport, La Guira, by railway. A few other interior towns are also connected with seaports in this way. In all, the country has over 530 miles of railway in operation. Through a French cable it has communication with the rest of the world, and the important cities and towns have telegraph and telephone service.

The leading seaports are connected by steamer with the ports of Europe and the United States. The commerce of the country is not as great as its resources and population would warrant. The chief article of export is coffee. Other important exports include cacao, hides, deer and goat skins, rubber, tobacco, fustic and some other forest products. Some cattle are shipped to Cuba. Most of the coffee and hides go to the United States. The imports consist of foodstuffs, manufactured goods and machinery.

Government. The government is republican in form. The present constitution was adopted in 1914. The head of the executive department is the President, who is elected for seven years and is assisted by a Cabinet of Ministers, through whom he acts. The members of the council are appointed by Congress every two years, and the President is chosen by the Congress. The legislative power is vested in a Congress of two houses, a Senate and a Chamber of Deputies. The

members of the Senate are apportioned two to each state and district, and are elected for three years. The Deputies are apportioned according to population, one to every 35,000 and one every 15,000 additional inhabitants, and are elected by universal suffrage. No state is deprived of a Deputy if its population is less than 35,000. Each province or state has its own legislature and executive, while the unorganized territories and colonies are governed by an executive appointed by the national government.

History. The coast of Venezuela was first seen by Columbus in 1498. The following year it was more carefully examined by Vespuccius, who gave the region the name it now bears, which means *Little Venice*; it was applied because of the discovery of an Indian village built on palisades over the waters of Lake Maracaibo. The first Spanish settlement was made in 1527, and for more than two centuries the country was a Spanish colony, during which time it suffered from change of rulers and internal dissensions. The early Spaniards treated the natives in a most cruel manner and enslaved many of them. The struggle for independence began early in the nineteenth century and was completed by the efforts of the patriots under Bolivar in 1821, when Venezuela and New Granada united under one government and formed the country of Colombia. In 1829 Venezuela seceded and became an independent republic. The country has always suffered from frequent revolutions and rebellions. It has also had several disputes with European powers concerning boundary lines. The last of these assumed such importance that in 1894 the United States recognized the seriousness of the contention between Venezuela and Great Britain and suggested to the latter country that the dispute be settled by arbitration. This was finally agreed to, and the question was submitted to a special tribunal, which in 1899 made final settlement of the boundary line between Venezuela and British Guiana.

In 1897 a serious political disturbance began, which led, two years later, to a rebellion. This became so widespread that it threatened the existence of the established government, but in October, 1902, the revolutionists suffered a serious defeat, and their army was dispersed. In 1902 the country had a serious dispute with France, Germany and Great Britain over the payment of claims

due subjects of these several nations, and in December Great Britain and Germany combined in a naval demonstration and blockaded some of the Venezuelan ports. Through the intercession of the United States, however, all parties agreed to submit the dispute to the court of arbitration at The Hague, and the points in dispute were satisfactorily adjusted.

Related Articles. Consult the following titles for additional information:

| | |
|----------------|-----------|
| Bolivar, Simon | Maracaibo |
| Caracas | Trinidad |

VENICE, *ven'is*, ITALY, a city famed throughout the world for its unique character and splendid art treasures. Venice, built on a cluster of islands, has canals for its principal streets, and more bridges than any other city in the world. Gondolas and other boats take the place of cabs, street cars and automobiles. The city lies in a sheltered lagoon on the northwestern shore of the Adriatic Sea, 164 miles by rail east of Milan. The islands on which it is built number 120, and are divided into two main groups, between which flows the celebrated Grand Canal. This canal, which is the principal thoroughfare, passes through the city in the form of a letter *S* and divides it into two nearly equal parts. The canal is crossed by four bridges, the chief of which is the Rialto. There are 146 smaller canals, by means of which all parts of the city can be reached by boat.

The description which follows applies to Venice as it exists in normal years. During the World War it was repeatedly attacked by airplanes, and was on one occasion threatened with capture. Its most valuable art treasures were removed to Rome and other interior centers, but these were returned at the close of the war.

The Piazza, or Square of Saint Mark's, is the center of interest. This is the great center of business and amusement. It is 576 feet long, 269 feet wide on one side and 185 feet wide on the other. The east side is faced by the Cathedral of Saint Mark's, one of the most renowned structures of its kind in the world. On the north and south sides of the square are the palaces formerly occupied by the procurators of the cathedral, and they now form a part of the royal palace. These buildings contain many rare paintings by some of the most celebrated artists of Venice, including Tintoretto and Paul Veronese. The famous Campanile, which fell in 1902, and was rebuilt, also faces the square. Another object of interest facing

the square is the clock tower, built in 1496 and surmounted by two bronze figures, which strike the hours on a large bell.

Among the churches of special interest is that of Santa Maria della Salute, which contains excellent paintings of Titian, including



his masterpiece, *The Assumption of the Virgin*, and *The Presentation in the Temple*. The Church of San Sebastiano is celebrated for its altarpieces by Paul Veronese, and the Friari, a church built for the friars, is interesting for its size and because it is a good representation of the Italian Gothic style of architecture. It contains many monuments and pictures. The palaces are of no less interest than the churches. Of these the palace of the Doges, originally built in 800, but several times destroyed and rebuilt, is the most important. During the time of Venice's greatest prosperity, this was the residence of its rulers. It now contains many treasures of art. From the rear of this palace the celebrated "Bridge of Sighs" leads to the prison, which is still in use. Many of the palaces are now used for other purposes, serving as hotels, museums and office buildings. The Academy of Fine Arts is also of great interest, because it contains one of the most valuable collections of paintings found in Europe. The Rialto is the principal commercial street and typically represents the life of the city. The bridge of this name crosses the Grand Canal at the point where the first settlement was made.

Modern Venice is of considerable commercial importance. The manufactures include lace, tapestries, mosaics, bronzes, jewelry and wood-carvings among its finer wares, and cotton and woolen goods, chemicals, heavy machinery and clocks among its larger industries. There is also some shipbuilding, and glassware is manufactured.

The islands occupied by the city were formerly a refuge from the hordes of barbarians which invaded Italy from the north. It is supposed that the first settlement was made about the middle of the fifth century, but there is no authentic record of the fact. In the sixth century Venice was independent, though it was tributary to the Eastern Empire. It was obliged to defend itself from pirates and from the Lombards of Italy, and because of this an organized government was formed and the leader or ruler, entitled *doge*, was selected. The Crusades gave the city a great impetus, because it became a commercial center for these military movements.

During the Middle Ages Venice had increased in commercial importance and power until considerable surrounding territory of the mainland was under its control, and just previous to the discovery of America it was the leading commercial city of Europe. From that time its influence began to wane. The Turks captured Constantinople and cut off much of the trade from the East. A route to India around the Cape of Good Hope also brought much of that trade to Portugal, and the commerce which had entered Europe through Venetian harbors now came through Genoa and other cities to the west. In 1797 the Venetian Republic was deprived of its independence by Napoleon, and most of the possessions were given to Austria. Within a few years the Austrians ceded Venice to Italy. Between this time and 1866, the city was alternately under the rule of Austria and Italy, until finally by vote of the inhabitants it was joined to Italy.

The proximity of Venice to the war zone during the World War, especially after the Austro-German drive of 1917, caused great anxiety as to its fate, but it was never captured. However, the uncertain conditions caused thousands of its inhabitants to flee, and until the close of the war it retained only the memories of its former glory and activity. Time and peace have restored its prosperity and made it again the mecca of art lovers and tourists. In 1914 its estimated population was 163,000; by 1921 census, 171,665.

Related Articles. Consult the following titles for additional information:

| | |
|-----------------|---------------|
| Adriatic Sea | Doge |
| Bridge of Sighs | Saint Mark's, |
| Campanile | Cathedral of |

VENIZELOS, *ven e za' lohs*, ELEUTHERIOS (1864—), an eminent Greek lawyer and

statesman, through whose influence Greece was brought into the World War on the side of the entente allies, was born of humble parentage on the island of Crete. He was educated in Canea, Crete and the University of Athens. After completing his education Venizelos returned to Crete, and at the age of twenty-three was elected to the assembly, where he soon became the leader of the liberal party. In 1910 he removed to Athens to become the leader of a party founded by the Military League, which was working for constitutional reform. Within a year he was chosen Prime Minister, and his influence became so strong that several factions united to oppose his policies.

In 1913 King Constantine, whose wife was a sister of Emperor William II, ascended the throne of Greece. At the outbreak of the World War, Venizelos led the movement to unite Greece with the entente allies, but Constantine advocated strict neutrality. Venizelos resigned in March, 1915, since he and the king could not work together. He was, however, persuaded to form a new Ministry; when Bulgaria entered the war against Serbia, he insisted that the Greek forces be mobilized, and accomplished his purpose in spite of the king's opposition. Since Greece was bound by treaty to go to the aid of Serbia if it were attacked by Bulgaria, Venizelos insisted that this agreement be fulfilled. Constantine refused his consent, and the Prime Minister again resigned.

In September, 1916, Venizelos and his followers set up a provisional government at Canea, but later transferred it to Saloniki. When Constantine was forced to abdicate in 1917, Venizelos was returned to power and Greece joined the forces against the Central Powers. He represented his country at the peace conference at Versailles in 1919. See GREECE; WORLD WAR.

VENTILATION, *ven ti la'shun*. See HEATING AND VENTILATION.

VENTRILOQUISM, *ven tril' o kwiz'm*, the art of speaking in such a way that the voice seems to come not from the speaker but from another source. Long practice is necessary to develop the art to perfection. The ventriloquist is able to "throw his voice," or produce the illusion of distance chiefly by proper control of his larynx. He draws a full breath, speaks without moving the muscles of his face, neck or chest, expelling the air through a narrow glottis. The ven-

triloquist's success depends largely on his skill in directing the imagination of his audience. The human ear is not quick to detect the direction from which a sound comes, and if a listener's attention is directed to a particular location his imagination is apt to associate it with the sound he hears.

VEN'UE, CHANGE OF, a change in the county or judicial district in which a case in law is brought to trial. It is made for the convenience of witnesses or on motion of the defense because prejudice on the part of the court or community precludes a fair trial in the jurisdiction where the action is brought. Change of venue is regulated by statute.

VE'NUS, the Roman name for the goddess of love. The Greeks called her **APHRODITE**. By some accounts she was the daughter of Jupiter, but according to the most popular legend she was born from the sea foam, near the island of Cythera. She was brought up by the nymphs in their ocean caves, and when she had attained the fulness of her size and beauty, she was conducted to Olympus, where she excited the greatest admiration. All of the gods wished to marry her, but she scorned them all, and as a punishment she was compelled by Jupiter to marry Vulcan, the ugliest of the gods. He gained no great happiness from the union, for Venus always despised him and bestowed her love on Mars and on the mortals Adonis and Anchises. Cupid was her son by Mars, and Aeneas was her son by Anchises. Venus was the special protectress of all young people who were in love, but she does not seem to have continued her interest in their affairs after they were once married. She was consequently chiefly worshiped by young people.

VENUS, one of the smallest but the most brilliant and conspicuous of the planets, second from the sun, its orbit lying between Mercury and the Earth. To the ancients, Venus was known as *Lucifer*, morning star, and *Hesperus*, evening star, according as it was seen after sunset or before sunrise. As evening star on clear moonless nights it may be observed to cast a shadow, its reflecting power being three times as great as that of the moon, due probably to a dense atmosphere and the presence of many clouds. The diameter of Venus is 7,700 miles, and it is 67,200,000 miles distant from the sun. Its sidereal revolution is performed in 225

days; its rotation period remains in doubt, because of difficulty of observation. It has various phases, according to the position it occupies, appearing as a thin crescent, gradually increasing to a full circle and then decreasing until it disappears.

Transit of Venus, the passage of the planet Venus across the disk of the sun, an occurrence of unsurpassed interest to astronomers and the entire scientific world. A full transit of Venus across the center of the sun's disk occupies about eight hours, the time being shortened when it occurs nearer the edge of the disk. Transits of Venus were observed in 1874 and 1882, and will occur again in 2004 and 2012.

VENUS DE MILO. See **SCULPTURE**.

VENUS'S FLOWER BASKET, a beautiful sponge, whose skeleton looks like spun glass, woven into an exquisite pattern, so delicate and white that one can scarcely believe it to be a natural skeleton. It is found in the deep sea near the Philippine Islands.

VENUS'S FLY'TRAP, or **DIONAEA**, *di o né'a*, a plant of the sundew family, the leaves of which serve as traps for insects, upon which the plant feeds. It grows in the sandy soil of the North Carolina coast, and the insects it entraps are necessary to supply it with the nitrogen lacking in the earth. A flower stalk bearing a cluster of small white flowers rises from a rosette of leaves which spring directly from the ground. Each leaf is divided into two parts, the lower, flat and bladelike in ap-



VENUS'S FLYTRAP

pearance, and the upper, a roundish portion, consisting of two lobes, divided by a midrib. On the surfaces of the lobes are sensitive, hairlike processes, and along the edges are sharp bristles. When an insect alights on one of these sensitive hairs, the two lobes come together like a trap. A fluid is secreted by means of which the plant assimilates the juices of the animal. When the food is exhausted the leaf opens. After a leaf has captured several insects it loses its vitality and dies. See **SUNDEW**.

VERA CRUZ, *va'rah krooz*, MEXICO, the chief seaport of the republic, situated on an arm of the Gulf of Mexico, about 190 miles east of Mexico City. Though the site is low and sandy and the climate somewhat unhealthful, the construction of sanitation and port works has greatly improved conditions and has prevented the recurrence of periodic outbreaks of yellow fever. At the entrance of the fine harbor is the picturesque old fortress of San Juan de Ulloa, formerly used as a prison, but now only an interesting relic of colonial days. The city itself, with its encircling wall built of coral, is very attractive. Buildings of recent construction include a customhouse and a post and telegraph office, both constructed of cement, and the handsome building of the general lighthouse board, erected on land reclaimed from the sea. The dwelling houses of Vera Cruz are built of coral limestone in Spanish style.

The streets of the city are narrow, but are straight and well-kept, and are paved with asphalt over a wide area. Liberty Boulevard is the handsomest thoroughfare, and there are two public gardens. Prominent institutions include Vera Cruz Institute (a high school), the naval school, the only one of the kind in Mexico, the public library and a hospital. There are several factories, and fishing is an important occupation. Vera Cruz has a large, commodious harbor, with modern docks and other improvements, and enjoys a large general trade. Regular lines of steamers from the United States, the West Indies and Europe visit the port, and four railway lines meet here.

The city was founded by Cortez in 1520. During the Mexican War it was captured by Americans, and in 1914 it was temporarily occupied by United States marines as a result of Huerta's insult to the flag (see MEXICO, subhead *History*). To the Americans chief credit is due for making the city sanitary, for during their occupation they cleaned it thoroughly: Population, about 50,000.

VERB. The verb is that part of speech which expresses action or that tells what some object is or does, as, "The boy *runs*," "The man *lifts* the stone," "Fishes *swim*," "He *suffers* much," "The leaves *are* green." Verbs usually have the power of indicating time and mode, by means of tenses and moods,

these varying in the different languages, as does also the conjugation, or system of verbal inflections and forms as a whole.

According to their relation to objects, verbs are classed as *transitive* and *intransitive*. A transitive does or may take an object, as "John *struck* Harry." An intransitive verb may not or cannot take an object, as "The tree *falls*." Some verbs are used both transitively and intransitively, as "The boy *studies*" and "The boy *studies his lesson*." According to their form in different tenses, verbs are *regular* or *irregular*. A regular verb forms its past tense and past participle by adding *d* or *ed* to the present tense form, as *live*, *lived*. Irregular verbs form their past tense and past participle otherwise, as *give*, *gave*.

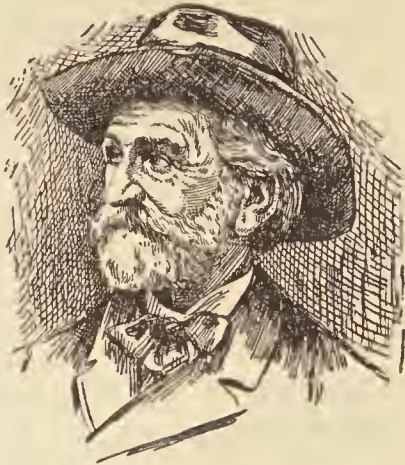
Transitive verbs are in the *active* or *passive voice*, according to their representation of the subject as *acting* or as *being acted upon*, as "The sun *attracts* the earth," "The earth *is attracted* by the sun." *Auxiliary* verbs are those used with principal verbs to indicate mood and tense, as "The man *is* here," "The man *was here* yesterday," "I *will* go tomorrow." *Inflection* of a verb is giving the changes in form to denote person, number and tense. *Conjugation* is the process of systematically carrying a verb through all its different moods, tenses, persons and numbers, in both active and passive voices, if it is a transitive verb.

VERBENA, *vur be' nah*, a genus of tropical and subtropical American plants of the vervain family, several species of which are cultivated for the beauty of their flowers. The cultivated varieties have creeping or spreading stems and bear their blossoms in dense, showy spikes, of almost every color except yellow. The wild varieties are often troublesome as weeds. The verbena of the perfumers is the lemon grass, from which the oil of verbena is extracted.

VERDI, *ver'de*, GIUSEPPE (1813-1901), the greatest composer of opera Italy has produced. He was born at Roncole, near Parma, the son of a poor storekeeper. He early showed a fondness for music, and at the age of eight began his studies with the village organist. Later he was taught for three years by the organist of a neighboring village. Verdi then went to Milan and placed himself under the conductor of the famous Scala Theater. In 1839 an opera of his was accepted by the Scala management, and the price paid for it—about four

hundred dollars—was more money than the composer had ever before possessed in all the combined years of his life. Verdi had married some years previously, and the struggle with poverty had been a hard one.

With the acceptance of his first opera and commissions for new ones, the eve of a better day seemed at hand. Then suddenly his wife and both of his children died. After a long period of inactivity which followed this crushing loss, the composer



GIUSEPPE VERDI

returned to his labors with redoubled energy and produced in succession *The Corsair*, *Rigoletto*, *Il Trovatore* and *La Traviata*; and in a few years Verdi found himself a rich man. In 1870 the khedive of Egypt commissioned from him an opera for the opening of a Cairo Theater, and *Aida* was written. This is considered his best work. Later operas were *Othello* and *Falstaff*, both founded on the Shakespearean dramas of the same names. No other composer of opera has so endeared himself to the masses as has Verdi. The haunting melodies of *Il Trovatore* and of others scarcely less famous are known throughout the world.

VERDIGRIS, *vur' de grees*, a greenish substance that forms on copper when exposed to acetic acid. It is used principally in the composition of paints and Paris Green, in the manufacture of dyes and as an ointment, or liniment. Taken internally, it is poisonous. White of egg and milk are antidotes.

VERDUN, *vair duN'*, FRANCE, a ruined fortified town in the northern part of the country, a "rock of history around which the storms of battle have raged repeatedly." In 1792, during the French Revolution, and in 1870, after a bitter siege, it was occupied by the Germans, and for months during the World War it was the scene of the most desperate fighting. It was before Verdun, however, in the last great struggle, that the French vowed "*Ils ne passeront pas*" ("They shall not pass"), and it was here that the flower of the army of the Crown Prince of Germany spent itself in vain. Verdun lies in the valley of the Meuse River, 175 miles by

rail from Paris, and forty-two miles from Metz, which is again a French city. Before the war Verdun was a town of 20,000 inhabitants, and a center for the manufacture of hardware, confections, leather goods and liquors.

Battle of Verdun. After the war of 1870-1871 Verdun was made a first-class fortress, having about it a thirty-mile ring of sixteen large forts and twenty smaller works. The great attack on the outer defenses was begun in February, 1916. General Pétain commanded the French forces. During seven months of the most sanguinary fighting, from February to September, the Germans gained 130 square miles of territory, but failed to capture the heart of the fortress; had they succeeded they would have made a breach in the allied defense of Paris. In October a counter-attack under General Nivelle was begun, which was followed by a second offensive in December. The French succeeded in reaching the second line of defenses by February, 1917, and, after a period of inactivity, began a third offensive in August. A succession of smashing blows drove the Germans back until all the dominating positions were in French hands. The Battle of Verdun is counted a great allied victory. The losses were exceedingly heavy on both sides; it is believed the Germans lost over half a million men.

VERESTCHAGIN, *vyeh reh shchah'gin*, VASILII (1842-1904), a Russian painter, noted especially for his pictures of war scenes. He was born at Novgorod, and was educated in Saint Petersburg (Petrograd) and in France and Germany. Among his productions are a series of paintings based on the expedition of 1867 against the Central Asian provinces, *The Departure of Napoleon from Moscow* and *Roosevelt at the Head of the Rough Riders*. Verestchagin depicted the cruel side of war with remarkable realism. He was killed in the Russo-Japanese War, while on a battleship which was sunk by the Japanese.

VERGIL, *vur' jil* (70-19 B. C.), the common designation of Publius Vergilius Maro, a great Roman poet, author of the *Aeneid*. He was born near Mantua, in northern Italy, and was the son of a small land-owner. His education, which was careful and thorough, was received at Cremona, Milan, Naples and Rome, where he became thoroughly acquainted with the Epicurean philosophy. A

naturally retiring disposition and a delicate constitution, together with the fact of his not being by birth a Roman citizen, would have checked any aspirations he might have had to the calling of the soldier, the orator or the statesman. He retired to his father's estate, with the intention of passing his life in the pursuit of poetry and agriculture, but was rudely disturbed by the allotment of his farm to the soldiers of Octavius, after the Battle of Philippi (42 B. C.). He recovered it through the aid of Asinius Pollio, the Roman governor; but further troubles arose, and he abandoned it, going at the instance of friends to Rome, where soon afterward he became acquainted with Maecenas and Octavius, to whom Pollio had recommended him. Through these powerful friends he received an estate in Campania and was enabled to devote his life to his favorite pursuits.

Vergil had become a great favorite of Octavius, and when, after the Battle of Actium (31 B. C.), the latter became Augustus, the poet was not forgotten. It was under the encouragement and patronage of the emperor that Vergil's greatest work, the *Aeneid*, was written; and indeed only the firm establishment of the Empire and the glorious achievements of Augustus in war and peace could have produced such an epic. During the years of its composition the poet recited selections before the imperial household. When the *Aeneid* was brought to a close, Vergil went to Athens, intending to spend a few years in revising the poem and completing certain unfinished parts. Soon afterward Augustus arrived in Athens from the East, and he induced Vergil to accompany him to Italy. Under the strain of seasickness and exposure to the strong sea air, his delicate constitution broke down, and he barely lived to reach Italy, dying at Brundisium, Sept. 21, 19 B. C. Rather than leave his life-work, the *Aeneid*, imperfect and incomplete, he ordered it burned, but finally yielded to the request of Augustus, that its revision might be entrusted to his friends Tucca and Varius, who edited it with the utmost care. The first of Vergil's poems of which the authorship is certain are the *Bucolics*, or *Eclogues*. While based on the model of the *Idyls* of Theocritus, these ten poems are by no means solely pastoral in character. Many contain allusions or are entirely devoted to current political events or to matters concerning the poet, the background and language alone

being pastoral. The *Georgics* comprise four books of didactic poems on agricultural subjects. Book I deals with the tilling of the soil; Book II, with the cultivation of fruit trees; Book III tells of horses and cattle, and Book IV treats of bees. The *Georgics* are addressed to Maecenas and were said by some to have been written at his patron's request; the work is the most finished of all Vergil's poetry.

The *Aeneid*, the composition of which probably occupied most of the twelve years between the beginning of Augustus's reign and the poet's death, is Vergil's greatest work, although it is not as highly polished as some of his other poems. In general treatment of character and incident, it is inferior to its Greek models, the *Iliad* and the *Odyssey*; but certain parts are very successfully handled; and the whole poem is conceived in a spirit of delicacy, true culture and noble patriotism. In refinement of expression and elegant metrical construction, Vergil has not been surpassed. For an outline of the poem, see AENEID.

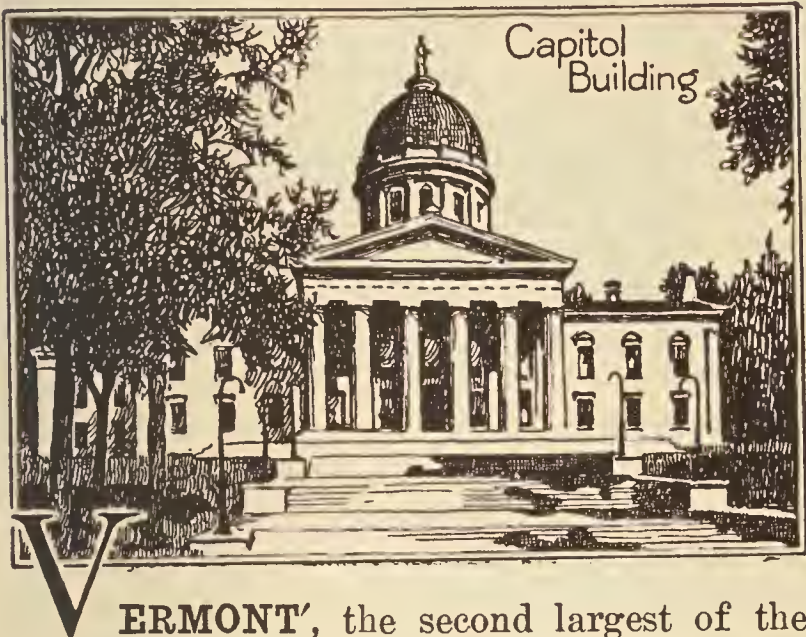
VERMES, *vur'meez*, or **WORMS**, that branch of the animal kingdom formerly including all invertebrate creatures (those without backbones) except the insects, but now restricted to such forms as earthworms, sea-worms and leeches. Most of the animals of this division have long, flat or cylindrical bodies, which are divided more or less distinctly into segments which have no limbs. Many of the Vermes are parasites, and some live in the intestines of human beings, where they cause great discomfort. See ZOÖLOGY.

VERMICELLI, *vur me chel'le* or *vur me sel'le*. See MACARONI.

VERMIFORM, *vur'me form*, **APPENDIX**, a long, slender, wormlike organ, which opens from the colon near its lower end. It is normally from three to six inches in length and is hollow to its tip. It is in the right side of the lower abdomen and projects upward and inward in most cases. Little is known of its function, which is probably unimportant. See APPENDICITIS.

VERMIL'ION, a bright red pigment, named from a French word meaning *little worm*, because formerly crimson, or carmine, was obtained from a small red worm. The vermilion of commerce is obtained by mixing together in a revolving drum, mercury, sulphur and a solution of potash in

water, and heating the mixture to about 115°, when it gradually assumes a red color. Vermilion is a permanent color and can be used with water or oil, but volatilizes at red heat and cannot be used for enamels. Cinabar, a sulphide of mercury which occurs in large quantities in California, Brazil, Spain, China and other countries, is also a valuable source of vermilion.



VERMONT', the second largest of the New England states, popularly called the GREEN MOUNTAIN STATE, *green mountains* being an English translation of the French words *verts* and *monts*, from which *Vermont* is derived. The state is appropriately named, for its picturesque mountains with their wooded slopes are among the most charming phases of New England scenery. The flower emblem of the state is the red clover.

Location and Area. Vermont lies directly south of the Canadian province of Quebec, and its southern boundary follows the northern Massachusetts line. It is bounded on the east by New Hampshire, from which it is separated by the Connecticut River, and on the west by New York. It is therefore the only New England state having no coast line. The western boundary, however, follows the deepest channels of Lake Champlain for more than one hundred miles, and over half the lake belongs to Vermont. Along the northern boundary the state is ninety miles wide; along the southern, but forty. From north to south it is about 150 miles in extent, and its area is 9,564 square miles, 220 square miles in excess of the area of New Hampshire. Maine, the largest New England state, is over three times as large as Vermont, which ranks forty-second in size among the states of the Union.

People and Cities. In 1920, when the population was 352,428, Vermont was the

forty-second state in number of inhabitants. Since the Thirteenth Census it has dropped behind Idaho and New Mexico in population, according to the Federal census. The census of 1920 credited it with 352,421 inhabitants. The average density per square mile is 38.6; for entire United States it is a little lower, or 35.5.

Nearly one-third of the foreign-born inhabitants, who number about 50,000, are French-Canadians, and consequently the Roman Catholic Church claims the largest number of adherents of any one denomination. Among Protestant bodies, the Congregational, Methodist, Baptist and Episcopal are the most important.

Slightly more than half the population live under rural conditions. Burlington, with a population of 22,779 in 1920, is the largest city. Rutland, Barre and Bennington are next in order. Montpelier (7,125 in 1920) is the capital.

Surface and Drainage. The entire state is mountainous, owing to the presence of the Green Mountain range, which extends from the Canadian border into Massachusetts, and to numerous parallel ranges, which extend in a nearly north and south direction. The Taconic range lies in the southwestern part of the state and is parallel to the main range. There are also several short ranges in the northern and eastern sections. The highest peaks of the main range from north to south are Jay, Sterling, Mansfield, Camel's Hump, Lincoln, Pico, Killington, Shrewsbury, Stratton and Haystack, of which Mount Mansfield, with an altitude of 4,364 feet, is the highest. There are twenty-one peaks having an altitude of 3,500 feet or more. All of the mountains of the parallel ranges are comparatively low, have rounded summits and are well timbered. These various ranges are separated by low, broad valleys, through which one or more streams flow and which have fairly fertile soil. The lowest point in the state is the valley of Lake Champlain. In general the surface is a combination of forest-clad hills and mountains, beautiful valleys and sparkling lakes and streams.

The eastern half of the state is drained by the Connecticut River and its tributaries, the most important of these being the Passumpsic, the Waits, the White, the Ottaquechee, the Williams, the Saxtons and the West. The western part of the state is drained into Lake Champlain and thence

into the Saint Lawrence River. The most important streams flowing into the lake are the Missisquoi, the Lamoille, the Winooski and the Otter Creek, the last being the largest river wholly within the state. The southwestern section is drained into the Hudson River by the Battenkill and the Hoosic.

The most important lake is Lake Champlain, more than half of which belongs to Vermont. Other lakes in the Champlain Valley are Bomoseen, Saint Catherine and Dunmore. In the northeastern part of the state is Lake Memphremagog, a portion of which is in Vermont and the remainder in Canada. Southeast of this is Willoughby Lake, renowned for its peculiar surroundings. The lake is about six miles long and lies between two mountains which seem to have been rent asunder in some past geologic age. This region also contains numerous other smaller lakes, frequently known as ponds. All of these bodies of water have become favorite summer resorts.

Climate. The climate of Vermont is subject to extreme and sudden changes. In summer the temperature varies from 65° to 90° in winter it ranges from 18° to 45°. At Burlington the mean annual temperature is 45°. The climate is milder in the Champlain Valley than east of the Green Mountains. During the winter there is often much snow, which in the colder parts of the state covers the ground for three months. The average annual rainfall is thirty-three inches. The air is clear and pure.

Mineral Resources. The chief mineral wealth of the state is in its quarries. No other state in the Union produces so great a variety or quantity of marble and granite, and Vermont has practically become the center of the marble and granite industries. The value of the annual output of granite exceeds \$3,000,000; the largest quarries are at Barre and Woodbury. The marble industry is chiefly in Rutland County. Roofing and other slate are obtained in large quantities, and the output is of fine quality.

Agriculture. The soil in the valleys along the streams and at the foot of the mountains and hills is usually fertile, though but very little of it compares favorably in this respect with the soils of the great prairie states in the Mississippi Valley. Agriculture is the leading industry of the state. The farms are comparatively small, averaging less than 200 acres, and most of them are tilled by their

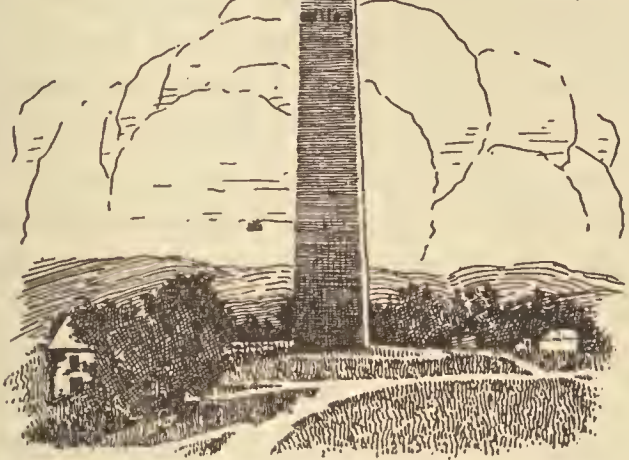
owners. Formerly Vermont was known for its production of wheat, oats, corn and potatoes, but since the development of the great agricultural states in the Mississippi Valley, the New England states have been unable to compete in the markets which the Western producers could reach; consequently, in recent years methods and products have been radically changed. Now intensified farming is generally practiced and the raising of wheat has given way to the raising of corn, which is very generally used as ensilage. Dairying is the chief agricultural industry. Excellent qualities of butter and cheese are made, and these find ready market in Boston and other Eastern cities. In the output of these products the state ranks among the first ten. Vermont has always been famed for the excellent breeds of horses produced there, and horses are still raised in large numbers. In some sections the raising of garden vegetables and apples for market is also a profitable industry, and Vermont is unsurpassed in the United States in the quality and quantity of maple sugar produced.

Manufactures. The chief manufacturing industries include dressing stone particularly marble and granite; the manufacture of scales, centered in Saint Johnsbury and in Rutland; the production of flour and other grist mill products; the manufacture of lumber products, and the manufacture of textiles, particularly woolen goods. Since the introduction of electrical power, many small factories have been established within the state, obtaining their power from mountain streams which were previously useless. This has increased the output of manufactures very materially since 1890.

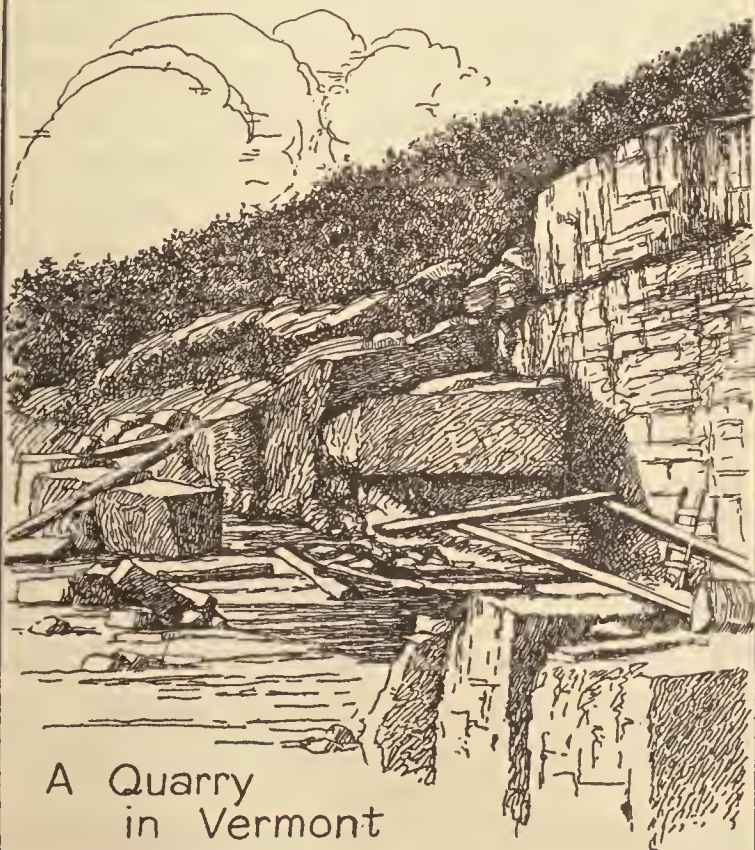
Transportation. The northwestern part of the state finds a ready outlet by water through Lake Champlain and the Richelieu River, but these are closed to navigation during the winter season. Lines of railway traverse the state from north to south, both on the eastern and western sides. There are also numerous cross lines so that every county has good railway facilities, and nearly every town is on a line of railway or within ready access of it. The railways of the state are under the control of the Rutland, the Boston & Maine and the Grand Trunk systems, and the total mileage is about 1,075. A number of electric lines connect near-by towns.

Government. The legislature consists of a senate of thirty members and a house

VERMONT



Bennington Battle Monument

State
SealRed Clover,
State FlowerA Quarry
in Vermont

of representatives of 246 members, the latter containing one representative for each town and city within the state. Both senators and representatives are elected every two years. The legislature meets biennially. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer and auditor, elected by the people for two years. The courts consist of a state supreme court of seven judges, a chancery court and county courts. The judges of the supreme court, the commissioner of education and some other officers are elected by the legislature for terms of two years. Women enjoy Presidential suffrage.

Education. The commissioner of education is at the head of the public school system. The township system is in vogue, in which the town constitutes the smallest unit for school purposes. County examiners are appointed by the governor and commissioner of education. It is the duty of the examiners to examine and license teachers. Supervision is by districts in which several adjoining towns are united. A superintendent who devotes his entire time to the work is appointed for each district. Graded schools are maintained in all of the larger towns and villages, most of which have high schools. The higher institutions of learning are the University of Vermont, at Burlington, with which is connected the State Agricultural College; Middlebury College, at Middlebury, and Norwich University at Northfield. Montpelier Seminary, at Montpelier; Goddard Seminary, at Barre; Saint Johnsbury Academy, at Saint Johnsbury; Vermont Academy, at Saxton's River, and Brigham Academy, at Bakersfield, are among the most prominent academies. There are normal schools at Johnson and Castleton. Teacher-training courses are also provided in a number of high schools and academies. In 1910 the normal school at Randolph was changed to the State School of Agriculture.

Institutions. The charitable and correctional institutions of the state include the state penitentiary at Windsor, the house of correction at Rutland, the industrial school at Vergennes, the state asylum for the insane at Waterbury, the soldiers' home at Bennington, the state sanatorium at Pittsford. There are also ten hospitals under the control of the state authorities.

History. The first white man to enter the territory of Vermont was probably Cham-

Items of Interest on Vermont

About 10,000 of the foreign-born inhabitants came from the British Isles. There are, besides, over 11,000 English-Canadians.

School attendance during the full school term is compulsory for children from six to fifteen years of age. No child less than sixteen who has not completed nine grades of school may work in any industrial establishment.

There are about 2,500 public schools in the state and nearly 65,000 enrolled pupils.

In January, 1920, Vermont had 290,000 milch cows, 155,000 other cattle, 77,000 horses, 63,000 sheep and 73,000 swine.

The marble quarries were first opened in 1785. They produce half of the marble of the United States.

During the summer months the people in the mountain and lake towns find entertaining the tourists a profitable occupation.

Vermont was the first state to adopt a clause in its constitution prohibiting slavery.

It was the first to be admitted after the adoption of the Federal Constitution.

The present constitution of Vermont was adopted in 1793.

Questions on Vermont

When was Vermont admitted to the Union?

What is the character of the surface of the state?

What is the highest mountain peak?

Name the principal rivers.

How has the introduction of electrical power affected the manufacturing industry?

What are the chief agricultural products?

How does Vermont rank in the production of maple sugar? Of marble?

What are the principal manufacturing industries?

For what products are some of the leading cities noted?

Why is the state a favorite summer resort?

plain (1609), but no settlements were made until 1665, when French trading posts were established on the western border. Vermont was the scene of numerous expeditions by both French and English during the French and Indian Wars. After the middle of the eighteenth century, the territory was a cause of dispute between New Hampshire and New York, each claiming jurisdiction over it, by reason of charters and royal grants. On accounts of the grants of lands made there by New Hampshire, Vermont came to be known as the *Hampshire Grants*. It was finally decided by England that New York had jurisdiction, but the settlers of Vermont, by means of organized militia, known as "Green Mountain Boys," resisted the establishment of the authority of New York. This resulted in several skirmishes.

During the Revolution, Vermont organized its own forces and fought with great effect against the Indians and British in the north. Meantime it set up a claim of independent statehood, and existed as an independent state for fourteen years, until it was admitted into the Union, March 4, 1791. Its progress during the nineteenth century was consistent. Its government in most respects was rather more democratic than that of other New England states. During the Civil War it furnished its full quota of troops, and it was the scene of the operations of the Fenians in 1866 and 1870. In 1852 an amendment prohibiting the sale of intoxicating liquors was adopted, but was repealed in 1902, high license and local option being substituted. Admiral George Dewey and Captain Charles E. Clark of the *Oregon* were among noted Vermonsters; President Chester A. Arthur and Vice-President Levi P. Morton and William A. Wheeler were also among her sons. The state has always been known for the sterling character of its people, and in proportion to its population has been second to none in the number of eminent men it has furnished to the nation.

Related Articles. Consult the following titles for additional information:

CITIES

| | |
|------------|------------|
| Barre | Montpelier |
| Bennington | Rutland |
| Burlington | |

PHYSICAL FEATURES

| | |
|-------------------|-------------------|
| Champlain, Lake | Memphremagog |
| Connecticut River | (lake) |
| Green Mountains | Taconic Mountains |

HISTORY

| | |
|-------------------|---------------------|
| Allen, Ethan | Green Mountain Boys |
| Champlain, Samuel | New Hampst. |
| | (history) |

VERMONT, UNIVERSITY OF, a coeducational institution of learning, founded in 1791 at Burlington. In 1862 the university was assured a share in the benefits of the land-grant act passed by Congress, and three years later the Vermont Agricultural College was incorporated with it. "State Agricultural College" is still a part of the legal title of the institution, which is organized into colleges of arts and science, engineering, agriculture and medicine. There is a student enrollment of about 1400, and a faculty of about 150. The library contains over 100,000 volumes.

VERNE, *vairn*, JULES (1828-1905), a popular French romancer. He studied law for some time, but afterward began writing short pieces for the stage. He then began

to write stories of adventure. The highly imaginative and fantastic exploits he recounted were given an air of plausibility by the author's manner of presenting them as scientifically possible. His first essay in the vein of the marvelous was *Five Weeks in a Balloon*. This was fol-



JULES VERNE

lowed by *Twenty Thousand Leagues under the Sea*, *From the Earth to the Moon*, *Around the World in Eighty Days*, *Michael Strogoff* and *The Mysterious Island*. Most of his books have been translated into the various European languages, and some even into Arabic and Japanese. They will long remain popular for their ingenuity and their lively style.

VERONA, *va ro'nah*, ITALY, next to Venice the most famous city in the Venetian plain. The city is so old that an old Roman amphitheater built by the emperor Diocletian still stands, for many years a ruin, eloquent of the dead past, but now restored. This building is over 500 feet long and is 106 feet high; it was built to seat 20,000 people. In the vicinity of the busiest part of the town is a marble tablet marking the spot where the people believe Juliet lived, and to whose house came Romeo. Through the town runs the swiftly-flowing Adige River, which is spanned by seven bridges. Population, 1916, about 86,000.

VERONESE, *va ro nay' zah*, PAUL (1528-1588), the popular name of Paolo Cagliari, an eminent Italian artist, born at Verona. He studied painting under his uncle, Antonio Badile, and worked successively in Venice, Rome and other cities of Italy; but Venice was his chief residence. Some idea of his talent may be gained from the fact that he was soon recognized as a rival of Titian and Tintoretto. He was an excellent colorist, as were most of the Venetian school, and he was distinguished by the richness and fertility of his imagination. His pictures are exceedingly numerous and varied in subject. Among his masterpieces are *The Marriage at Cana* (now in the Louvre), *The Calling of Saint Andrew to the Apostleship*, *The Rape of Europa*, *The Family of Darius at the Feet of Alexander*, *Adoration of the Magi*, *Consecration of Saint Nicholas and Saint Helena* and *The Vision of the Invention of the Cross*. The last five mentioned are in the National Gallery. Veronese died at Venice in the full maturity of his genius.

VERON'ICA, SAINT, a female saint, who, according to legend, met Jesus Christ bending under the weight of the cross and offered him her veil to wipe the sweat from his brow. The divine features were found miraculously impressed on the cloth, and this veil was brought from Palestine to Rome, where it is still preserved by the canons of Saint Peter's. Milan and other places claim they have the genuine veil.

VERRAZANO, *ver a tsah' no*, GIOVANNI DA (1480?-1527), a Florentine navigator, about whose life little is known. About 1523 he made his first voyage of discovery, and in 1524 he voyaged to America, probably touching the coast of North Carolina. He wrote a letter to Francis I, describing this voyage, and this letter is almost the only source of information concerning his discoveries. Some accounts relate that Verrazano was hanged as a corsair; others state that he died while preparing for another expedition to America. The exact truth may never be known.

VERSAILLES, *ver sah'y'*, FRANCE, the capital of the department of the Seine-et-Oise, situated twelve miles southwest of Paris. The town is noted as the location of the magnificent Palace of Versailles, erected in 1661 by Louis XIV and since that time the scene of a number of important and dramatic events in the history of France and of the

world. Here, in 1871, the French signed the hard treaty terms which concluded the Franco-German War; in July, 1919, the victorious allies concluded in the same palace peace terms with Germany at the close of the World War (see VERSAILLES, PALACE OF; VERSAILLES, TREATY OF). From 1871 to 1879 Versailles, was the seat of government of the republic of France. Population, 1921, 64,753.

VERSAILLES, PALACE OF, the famous residence of the Bourbon court and subsequent place of meeting of many important conferences for the adjustment of national and international affairs, including that following the World War. The palace was built as a residence by Louis XIV in 1661, at a cost of \$100,000,000. It was permanently occupied by the court about 1682 and remained its center for a hundred years, or until the overthrow of the Bourbons at the opening of the French Revolution. Since that time it has been used principally as a vast museum, its collections representing the development of French history and art from the time of Clovis to the present day. Especially interesting is a collection representing the era of the Crusades.

The Versailles palace is three stories high, in form a great square with wings at either side and at the back projecting into its surrounding park. It has an imposing façade a quarter of a mile long, above which are inscribed the words, *A toutes les gloires de la France* ("To all the glories of France"). The extensive Versailles gardens are filled with terraces, fountains, decorative ponds and artificially arranged trees and plants.

With the palace are associated the names of Mme. de Pompadour, Mme. du Barry and Marie Antoinette. Here was signed the Treaty of 1783 between England, France and Spain on the same day that England recognized the independence of the United States. Here, in 1789, was held the meeting of the States-General which formed the opening act of the French Revolution. During the Siege of Paris, 1870-71, King William of Prussia made his headquarters here, and there he was proclaimed Emperor William I of Germany. Again, in 1919, the interest of the world centered on Versailles, as the conference of the powers adjusted anew the affairs of a world shaken by the four years of the World War, this time with a new diplomacy based on the principles of a League of Nations.



Hall of Mirrors,
Where Treaty
Was Signed

VERSAILLES, TREATY OF, the name of the treaty which formally concluded the World War, negotiated by representatives of the allied powers on the one hand, and those of the central powers, including Turkey, on the other. There were four separate treaty agreements, made with Germany, Austria, Bulgaria and Turkey, respectively. The preliminary work on the agreements was carried on in Paris, but the

name Versailles is applied to the treaty because the actual signing of the agreement with Germany, the head of the Teutonic alliance, took place in Versailles, a suburb of Paris. The German treaty was the first one negotiated, and was signed in the famous Hall of Mirrors, in the Palace of Versailles, in the same room where, in 1871, William I was crowned emperor of Germany at the close of the Franco-German War.

The peace conference began sessions at Paris on January 18, 1919. The United States, the British Empire, France, Italy and Japan were represented by five delegates each; Brazil, Belgium and Serbia were represented by three each, and there were two each from China, Greece, Poland, Portugal, the Czecho-Slovak Republic, Rumania and the kingdom of Hedjaz. Two delegates were allotted respectively to Australia, Canada, South Africa and India, and one to New Zealand, as these British possessions had made great sacrifices for the allied cause. Other minor nations were allowed one delegate each, namely, Siam, Cuba, Guatemala, Haiti, Honduras, Siberia, Nicaragua, Panama and Montenegro. Each delegation acted as a unit. The most influential group consisted of the heads of the American, British, French and Italian commissions—President Woodrow Wilson and Premiers Lloyd-George, Clemenceau and Orlando. They were termed "the big four."

The conference held its sessions in the building of the Ministry of Foreign Affairs, meeting in a splendid reception room originally called Salle d'Horloge (Hall of the Clock). It required nearly six months to ne-

gotiate a treaty with Germany. On May 7, 1919, 109 days after the associated powers had begun their deliberations, German envoys received the terms on which the victorious powers were willing to make peace. The head of the German commission was Count von Brockdorff-Rantzau. A period of fifteen days was allotted the German envoys in which to reply to the terms. An extension of this period was granted, however, and German counter proposals were not delivered until May 29. On June 16, a revised version of the treaty, which had been slightly modified, was tendered the Germans, and on that date the delegation started for Germany. The German National Assembly at Weimar ratified the revised treaty on June 22, and on June 28 the terms were signed in Versailles. It was found necessary to appoint a new commission, the original envoys refusing to sign. A summary of the terms follows:

How Germany Paid. Germany was stripped of all colonial possessions, required to cede certain portions of its European domain, and forced to agree to the payment of heavy indemnities.

Territorial Changes. The following changes in Europe were authorized:

To France—Alsace-Lorraine, 5,600 square miles.

To Belgium—Two small districts (Eupen and Malmedy) between Holland and Luxembourg, 382 square miles.

To Poland—Part of Silesia and most of Posen and West Prussia, 27,686 square miles.

To league of nations—Mouth of Memel River and internationalized area around Danzig, 729 square miles; basin of the Sarre (internationalized temporarily), 738 square miles.

Territory depending on vote of people: Southeastern third of East Prussia and districts along the North Vistula River, 5,785 square miles. Northern Schleswig, 2,787 square miles. Upper Silesia.

France was given the right to use the output of the Sarre coal mines for fifteen years. A vote is to be taken at the end of that period to decide the future status of the Sarre valley. Germany ceded in all about 43,700 square miles.

The following changes in colonial possessions were authorized:

Togoland and Kamerun—future to be determined by the league of nations.

German East Africa—under the mandate of Great Britain.

German Southwest Africa—under the mandate of South Africa.

German Samoan Islands—under the mandate of New Zealand.

Caroline, Marshall and Ladrone Islands—under the mandate of Japan.

New Guinea—under the mandate of Australia.

Total, about 1,139,800 square miles.

German concessions in China, notably Kiaochau and the Shantung peninsula, were transferred to Japan.

Other Conditions. Germany lost most of its navy and most of its merchant marine, and the army was ordered reduced to 200,000 men. Possession of fourteen submarine cables was ordered relinquished, and sovereignty over the Kiel Canal, the Rhine and other important rivers was lost. Reparation for all damage done by the war was demanded, the amount to be determined by international commissions. (Estimated, \$25,000,000,000 or more.) Luxembourg was freed from the German customs-union. Germany was required to recognize the independence of German Austria and Czecho-Slovakia, French control in Morocco and the British protectorate in Egypt. Though not admitted as a member, Germany was required to recognize the principle of the league of nations, the provisions for which occupied the first section of the treaty.

Austrian Settlement. The complete text of the Austrian treaty was handed to the Austrian delegation at Saint Germain, France, on July 20, the first section having been tendered on June 2.

There were boundary disputes with Jugoslavia, Czecho-Slovakia and Italy, but eventually Austria was reduced to the following territories:

| PROVINCE | AREA (Sq. m.) | POPULATION (1920) |
|---------------------|------------------|----------------------|
| Lower Austria | 7,569 | 3,298,661 |
| Upper Austria | 4,628 | 858,795 |
| Salzburg | 2,763 | 214,200 |
| Styria | 6,327 | 953,684 |
| Carinthia | 3,684 | 366,589 |
| Tyrol | 4,790 | 306,304 |
| Vorarlburg | 1,005 | 133,212 |
| Burgenland | 1,586 | 296,891 |
| Total . | 32,352 | 6,428,336 |

Austria's army was limited to 30,000 men, and the country was required to guarantee reparations for damages and to assume a portion of the debt of the old empire.

Turkish Settlement. It was generally accepted that the Turkish Empire would be dismembered. Among several plans proposed, the following is believed to embody the final demands:

That Constantinople be placed under the administration of an international board, with the sultan exercising nominal suzerainty; that the greater part of Anatolia, or

Asia Minor, be left under Turkish control, as the population is dominantly Turkish; that Turkey in Europe be divided between Greece and Bulgaria, and that Greece be given Smyrna and islands off the western coast of Anatolia; that Arabia be united under the king of Hedjas as an independent state; that Armenia be recognized as an independent state under the guardianship of America or Great Britain; that Syria and Mesopotamia be made independent states under French and British protection, respectively; that Palestine be a separate state under British protection.

Bulgarian Settlement. While preliminary work was being carried on in regard to the Bulgarian treaty, the Bulgars were asking that the Dobrudja and Macedonia be incorporated in the Bulgarian kingdom. The Bulgarian claims, as set forth by the Foreign Minister, were as follows:

In the East we think we are justified in asking for the restoration of the Adrianople district as far as the Media-Enos line, which was awarded to Bulgaria by the London treaty of May, 1913. On the south we expect free access to the Aegean Sea from Enos to Orfani. In Macedonia we expect that portion which was admitted by the Serbians in their treaty with us in 1912 as of Bulgarian origin and character, which includes the towns of Monastir, Prilep, and Veles (Koprili). As for the part which is designated in the treaty as the "contested zone," which includes the districts of Uskub and Kumanova, the decision respecting which was to be left under the terms of the treaty to the then Russian emperor, we are content to leave to the peace conference to determine. As to Dobrudja, we hope the peace conference will undo the injustice done Bulgaria when this province was taken from her by the Russians in order that they might give it to Rumania in return for Bessarabia.

There was a feeling on the part of the allied commissioners that Bulgarian demands were excessive, and that they could not be granted. Settlement of the Balkan boundaries in a just and impartial way is essential for the future peace of Europe, and the whole problem was being considered from every point of view. See **WORLD WAR**.

VERSE, *vurs*, a line of poetry, or, more commonly but less correctly, a stanza composed of several lines. The term is also used, in its broader sense, to mean the measured and cadenced form of speech or composition adopted in poetry. Verse, as simply cadenced lines, is of great antiquity, but the use of rhymed cadences is comparatively modern.

Blank verse is verse in which the lines do not end in rhymes. For the classifications of verse on the basis of meter, see **METER**.

VER'TEBRATES, or **VERTEBRA'TA**, the highest branch of the animal kingdom, comprising all creatures having backbones. Vertebrates are classified as fishes, amphibians, reptiles, birds and mammals. Their bodies are capable of division into head, trunk and tail, and they have typically four limbs (fins in fishes) and an outer skin that consists of more than one layer of cells. The skeleton is internal, and the central nervous system consists of a nerve cord and brain, to which latter the sense organs are connected. Vertebrates also possess a system of sympathetic nerves, a digestive tract, respiratory organs (gills or lungs), special excretory organs, and reproductive organs, usually with separate sexes.

In the long process of evolution these anatomical essentials have been highly developed and variously differentiated. Not till the Tertiary Period, far down the line of the geological ages, did the mammals appear, while man, the youngest of creatures, is the development of the Pleistocene Age. As man advances in scientific knowledge and mechanical skill, penetrating to every part of the world, the other vertebrates become fewer and fewer, except as he domesticates them and raises them in numbers for use as food, the manufacture of clothing or means of transportation.

Related Articles. Consult the following titles for additional information:

| | | |
|------------|-------------|-----------|
| Amphibians | Fish and | Reptiles |
| Birds | Fisheries | Rodents |
| Carnivora | Mammals | Ungulates |
| Cetacea | Marsupialia | Zoölogy |
| | Primates | |

VERTIGO, *vur' te go*, an attack of giddiness, in which stationary objects appear to move in various directions, the person affected finding it difficult to maintain an erect position. It is a common symptom of excessive or defective supply of blood to the brain, as well as of nervous and general debility, though it also frequently arises from the disturbance of the digestive organs. Rapidly whirling the body will produce a severe form of vertigo.

VESPASIAN, *vez pa' zhe an* (9-79), emperor of Rome. After serving with distinction in Germany and in Britain, as commander of a legion, he was made consul. He afterward became proconsul of Africa; and on the rebellion of the Jews, he was sent with

an army into Judea. He reduced nearly all Galilee and was preparing to attack Jerusalem when he received news of Nero's death (A. D. 68). Then followed the emperors Galba, Otho and Vitellius, and in A. D. 69. Vespasian was himself elected emperor by the army. He left the siege of Jerusalem to his son Titus and returned to Rome. He immediately reformed the discipline of the army, purified the senatorial and equestrian orders and improved the administration of justice. He was the patron of learned men, particularly Quintilian, Pliny and Josephus. He rebuilt a part of the city, restored the capitol and erected the gigantic amphitheater, the ruins of which are still celebrated under the name of the *Colosseum*.

VESPUCCI, *ves poot' che*, AMERIGO. See AMERICUS VESPUCIUS.

VES'TA, a Roman divinity, the goddess of the hearth. She was worshiped, along with the Penates, at every family meal, when the household assembled round the hearth, which was in the center of the room. Her public sanctuary was in the Forum, and the sacred fire was kept constantly burning in it by the vestal virgins, her priestesses. A special building, near the temple, was set aside as the dwelling of the vestals. Each community had a hearth, on which was kept constantly alight the sacred fire of Vesta, and colonists setting out from a city took with them some of the old fire to kindle a flame in their new home. Few legends are connected with Vesta.

VESUVIUS, *ve su' vi us*, the only active volcano in Europe, situated on the Bay of Naples, in Italy. Its first recorded eruption took place in A. D. 79, when the city of Pompeii was buried under twenty feet of loose ashes and Herculaneum was covered by a torrent of mud. The elder Pliny, in command of the Roman fleet at Misenum, sailed to the relief of the distracted inhabitants, but was suffocated with them by volcanic vapors. The catastrophe is graphically described by his son, the younger Pliny, in two letters written to Tacitus, long after the event.

Another eruption of Vesuvius occurred in the year of 472, when ashes were carried as far as Constantinople. In 1794 and in 1822 there were also violent eruptions, and a series of lesser eruptions took place in the latter part of the last century, beginning with 1865. The latest eruption occurred in 1906. The mountain is a state of constant activity,

and, being of easy access, has been studied by more scientists and visited by more tourists than any other volcano in the world. An electric railway takes passengers from Naples to within 450 feet of the crater, and under direction of a guide visitors may descend some distance into the crater. An observatory is located on the west shoulder of the mountain, at an elevation of 2,200 feet.

Geologically, Vesuvius is thought to be of recent origin. It is a solitary mountain, with a base about thirty miles in circumference and is surmounted by two summits. The higher one, Vesuvius proper, is the cone from which are emitted the streams of lava. The lower one, known as Mount Somma, partly encloses the active cone. The mountain varies in height according to the amount of material thrown out or carried away by eruptions, averaging about 4,000 feet above the sea level.

Related Articles. Consult the following titles for additional information:

Herculaneum
Naples

Pompeii
Volcano

VETCH, a common name, rather loosely applied to several genera of climbing plants that are natives of the temperate zones. Many of them have been cultivated as forage plants for ages, and some yield edible seeds. Recently several species have been introduced into the United States for winter forage; the *hairy vetch* makes a good crop yielding from two to four tons of hay an acre. In Europe *spring vetch*, or *tare*, is more common. The plant has bluish-pink flowers resembling those of the pea, and compound leaves composed of twenty or thirty leaflets.

VETERINARY MEDICINE, the art which deals with the nature, causes and treatment of the disorders of the domestic animals. The first veterinary school was instituted in 1762 at Lyons, France; in 1766 that at Alfort, near Paris, was opened. A similar institution was established at London in 1791, and in the year following, one in Berlin. In the United States veterinary chairs have been added to the University of Pennsylvania, Cornell University and to several other leading universities, as well as to many of the schools of agriculture. Besides these, there are many private schools that give thorough instruction. Recently the requirements of admission to veterinary courses have been materially advanced, and in the better schools four-year courses of study are required.

The veterinarian must have a thorough knowledge of the anatomy and physiology of domestic animals, and of the causes and effects of the diseases common to them. Moreover, he must be a keen observer, for he must rely solely upon his observation in making a diagnosis; the horse or the cow cannot tell him how it feels or where pain is located. All states and the Canadian provinces require every veterinarian to possess a diploma from an approved school, or to take a rigid examination before he is allowed to practice.

One of the most valuable services that the veterinarian renders is the detection and prevention of contagious diseases among domestic animals, and his services for this purpose are usually authorized by the state, which maintains a board or commission, whose duty it is to see that the laws for preventing the spread of contagious diseases among domestic animals are enforced.

The Bureau of Animal Industry, in the United States Department of Agriculture, takes care of veterinary questions that come before the government, and the states and large cities have veterinarians who investigate diseases and attend to the enforcement of the veterinary laws of the districts in which they have power. Important documents are issued for public circulation by the Bureau of Animal Industry and by the experiment stations and boards of agriculture in the several states. In its progress veterinary medicine has kept pace with human medicine.

VE'TO, from the Latin, meaning *I forbid*, refers to the power of a chief executive to negative any legal measure originating in a lawmaking body. There are several forms of veto power, which may all be included in two main classes—*absolute* and *limited*. In the case of the former the executive action is final; in the case of the latter the legislature may override the executive decision, if an extraordinary majority is in favor of the bill.

In Great Britain the veto of the ruler is absolute, but the power has not been exercised since 1708. In France the veto is limited, of the form known as suspensive; that is, the President may suspend the operation of a law and demand its reconsideration. A similar form of limited veto is in effect in the United States, where the Presidential veto may be overridden by a two-thirds vote of the members of each house of Congress.

VI'ADUCT, a structure for carrying a waterway or roadway across a valley or low-

land or over a public highway. Viaducts of the older type usually consist of a series of arches of brick work, masonry or spans of steel, but of late they have been largely constructed of reinforced concrete. The viaduct crossing the Kaw River valley, connecting Kansas City, Mo., and Kansas City, Kan., has a length of 8,400 feet. The viaduct at Des Moines, Iowa, used by the Chicago & North Western Railroad, is 2,685 feet in length. Other notable viaducts are those over Tunkhannock Creek and Martin's Creek on the Lackawanna road, the one across the Pecos River in Texas, the viaduct over the White Elster at Goltsch, Saxony, and that at Gokteik, Burma. See **BRIDGE**.

VIC'AR, in a general sense, a representative or deputy authorized to perform the duties of another. In the Church of England a vicar is the priest of a parish, who receives only the smaller tithes, or a salary. In the United States the large city parishes which support two or more churches maintain a vicar for the clerical duties of the chapels.

In the Roman Catholic Church *vicar apostolic* is a bishop who possesses no diocese, but who exercises jurisdiction over a certain district by direct authority of the pope; *vicar-general* is the official assistant of a bishop or archbishop. The Pope calls himself the *Vicar of Christ on earth*.

VICE-ADMIRAL. See **ADMIRAL**.

VICE-PRESIDENT, the official of the United States government who is second in executive authority to the President. The Vice-President is chosen in the same way and for the same length of term as the President. A candidate for Vice-President must be a natural-born citizen of the United States, must have reached the age of thirty-five years and must have been for fourteen years a resident of the United States. He is inaugurated in the Senate chamber at Washington on the same day and immediately following the inauguration of the President. His chief duty is to preside over the sessions of the Senate. He is not allowed to vote, except in case of a tie. He becomes President if the President dies or is permanently incapacitated from performing the duties of his office; Tyler, Fillmore, Johnson, Arthur, Roosevelt and Coolidge succeeded to the Presidency in this manner. The salary of the Vice-President is \$12,000 a year.

VICE'ROY, an official who rules a province or colony in the name of a sovereign, there-

fore, a vice-king. The Governor-General of British India is unofficially called a viceroy, and the title has also been applied to the Lord-Lieutenant of Ireland.

VICKS'BURG, Miss., the largest city in the state and the county seat of Warren County, forty-three miles west of Jackson, on the Mississippi River, a few miles below the mouth of the Yazoo, and on the Yazoo & Mississippi Valley, the Alabama & Vicksburg, and the Vicksburg, Shreveport & Pacific railroads. The city is situated on a high bluff overlooking the river. Near it is the Vicksburg National Military Park, which restored the Vicksburg battle ground as it was in 1863. The principal buildings of the city are the courthouse, the Federal building and the Mississippi State Charity Hospital. The educational institutions include Saint Aloysius College for boys, Cherry Street College for colored students, and the Saint Francis Xavier Academy.

Vicksburg is the center of a large cotton-raising district and is noted for its cotton trade. It has numerous manufacturing establishments, including cottonseed-oil mills, saw and lumber mills, box, furniture, wagon, ice and boat-oar factories, canning establishments, boiler works, car shops, etc.

The town was laid out on the plantations of John Lane and William Vick, and the city was incorporated in 1840. During the early part of the Civil War it was strongly fortified, and after a long siege it was surrendered to General Grant on July 4, 1863. Population, 1910, 20,814; in 1920, 17,931, a loss of 14 per cent.

VIC'TOR EMMAN'UEL II (1820-1878), king of Sardinia, the son of Charles Albert. His aptitude for a military career became evident when he commanded the Savoy brigades against Austria (1848-1849), and he distinguished himself in the Battle of Goito by his reckless valor. After the Battle of Novara his father abdicated, and Victor Emmanuel ascended the throne of Sardinia. He had then to negotiate with Austria under most unfavorable circumstances, but he steadily refused to give up the principle of representative government in the Sardinian constitution, and this gained for him the good will of the Italian people. Under the advice of his celebrated minister, Cavour, he regulated the finances, reorganized the army and secularized the church property, for which he was excommunicated by the Pope.

Victor Emmanuel took part in the Crimean War against Russia, and in 1859, assisted by France, he renewed the contest with Austria, winning the battles of Magenta and Solferino. By the Treaty of Villafranca and the Peace of Zurich, which followed these successes, Lombardy was added to his dominions, but he had to cede Savoy and Nice to France. Parma, Modena and Tuscany now became united to Sardinia, and Garibaldi's successes in Sicily and Naples brought the whole of Southern Italy over to Victor Emmanuel. Early in 1861, he assumed the title of king of Italy. By the Peace of Vienna (1866) Austria ceded Venetia, and on the withdrawal of the French garrison from Rome in 1870 that city annexed itself to Italy. The king entered Rome on July 2, 1871, and took up his residence in the Quirinal. He was succeeded by his son Humbert.

Related Articles. Consult the following titles for additional information:

| | |
|---------------------|----------------------|
| Cavour, Count | Humbert I |
| Crimean War | Italy (history) |
| Garibaldi, Giuseppe | Sardinia, Kingdom of |

VIC'TOR EMMAN'UEL III (1869-), king of Italy, son of Humbert I and Queen Margharita. He entered the army in 1887 and was steadily advanced in rank. At the coronation of Nicholas II of Russia, in 1896, and at Queen Victoria's jubilee, in the following year, he was present as his father's representative. In 1896 he married Princess Helena of Montenegro. When his father was assassinated in 1900, he succeeded to the throne, and he proved a just and liberal ruler.



VICTOR
EMMANUEL III

The king assumed active command of the Italian armies on the Austrian front when Italy entered the World War, and his attitude throughout the war strengthened him in the esteem of his subjects. The royal pair have three children, princesses Yolanda and Mafalda, and Prince Humbert.

VICTO'RIA (1819-1901), a beloved Queen of the United Kingdom of Great Britain and Ireland, and Empress of India. She was the only child of Edward, Duke of Kent, fourth

son of George III, and was born at Kensington Palace. The duke died when Victoria was only eight months old, and she was brought up by her mother with exceptional prudence and care. Upon the death of her uncle William IV, June 20, 1837, she ascended the throne and was crowned at Westminster, June 28, 1838. The English people knew little of their young queen, who had been brought up in seclusion, but she soon proved herself possessed of the clear judgment and moderation which a sovereign needs, and of a thorough goodness which won the hearts of her subjects.

During the reign of Victoria there were eighteen changes of government, the following Premiers taking office at the

dates given: 1835, Melbourne; 1841, Peel; 1846, Russell; 1852, Derby; 1852, Aberdeen; 1855, Palmerston; 1858, Derby; 1859, Palmerston; 1865, Russell; 1866, Derby; 1868, Disraeli; 1868, Gladstone; 1874, Disraeli; 1880, Gladstone;

1885, Salisbury; 1886, Gladstone; 1886, Salisbury; 1892, Gladstone; 1895, Salisbury.

The leading events of the reign were the confederation of Canada; the Opium War in China; the abolition of the Corn Laws, under the administration of Sir Robert Peel; the successive steps in parliamentary reform; the enfranchisement of the Jews; the Catholic Emancipation act; the assumption of the government of India by the Crown; the Crimean War; the wars with Afghanistan, Abyssinia the Zulu tribes and Egypt; the long struggle on the Irish home-rule question the beginning of the South African War, and the Australian federation.

In February, 1840, Victoria was married to her cousin, Prince Albert of Saxe-Coburg-Gotha, and the marriage proved an unusually happy one. Four sons and five daughters were born to the royal couple. Victoria, Princess Royal, born in 1840, married in 1858 to Frederick William, afterward German Emperor, died in 1901; Albert Edward, Prince of Wales, born in 1841, married



VICTORIA

to Alexandra, daughter of the king of Denmark, succeeded to the throne on the death of his mother; Alice, born in 1843, married in 1862 to Prince Frederick William of Hesse, died in 1878; Alfred, born in 1844, married in 1874 to Marie, daughter of the Czar of Russia, died in 1901; Helena, born in 1846, was married in 1866 to Prince Christian of Denmark; Louise, born in 1848, was married in 1871 to the Marquis of Lorne; Arthur, born in 1850, was married in 1879 to Princess Louise Marguerite of Prussia; Leopold, born in 1853, married in 1882 to Princess Helen of Waldeck, died in 1884; Princess Beatrice, born in 1857, was married in 1885 to Prince Henry of Battenberg. In 1861 the Prince Consort died, and the queen withdrew from social life.

During the reign of Queen Victoria, Great Britain enjoyed a long era of uninterrupted prosperity; peace and contentment prevailed at home, and, with very rare exceptions, relations of amity were maintained with foreign powers. In length her reign was unprecedented in the world's history. It is true that Louis XIV of France ruled over a longer period than she, but subtracting the years during which he was under a regent, his responsible tenure of the crown was shorter than hers. Although George III nominally ruled sixty years, owing to his insanity a part of his reign was also under a regent.

In 1887 the people of Great Britain and the colonies celebrated the golden jubilee, or fiftieth year of Queen Victoria's reign. In 1897 they celebrated the diamond jubilee, with ceremonies more imposing than had ever attended any similar event. Representatives of all the colonies were present, and a grand procession, viewed by millions, moved through the streets of London. Victoria died January 22, 1901.

Related Articles. Consult the following titles for additional information:

| | |
|-------------------------|-------------------|
| Corn Laws | India (history) |
| Crimean War | South African War |
| Great Britain (history) | |

VICTORIA, a state of the Australian Commonwealth, situated in the southeastern part of the continent. Victoria is next to the smallest state of the Commonwealth, but is second in population. Only Tasmania has a smaller area, and New South Wales is the only state with more inhabitants. It is bounded on the north by New South Wales, on the south and southeast by the Indian

Ocean and on the west by South Australia. Its area is 87,884 square miles, or a little less than the areas of Virginia and North Carolina combined. It has about 600 miles of sea coast, with a considerable number of bays and indentations, especially about the middle, where Port Phillip Bay, with an area of 875 square miles and an entrance barely two miles wide, affords shelter sufficient for the largest fleet.

Surface and Drainage. The interior, though diversified by mountains, is chiefly distinguished by vast, unwooded plains, mostly occupied as pasture. There is one principal mountain range, a portion of the Great Dividing Range of Eastern Australia, running from east to west through the state, with various offshoots. The eastern portion of it, called the Australian Alps, with numerous northern and western ramifications, rises to 6,500 feet in Mount Bogong and to 6,100 feet in Mount Hotham, and has several other peaks exceeding 5,000 feet in height. The most westerly portion, called the Grampians, runs north and south, and in Mount William reaches a height of 5,600 feet. The Grampians and the Australian Alps are connected by such ranges as the Pyrenees and Hume Range, containing numerous cones and extinct craters. This is the region of the gold fields. The rivers are numerous, but they are generally small and dry up in summer, leaving the country parched. The chief is the Murray, which rises in the Australian Alps and forms the northern boundary of the state for 980 miles. It is 1,300 miles long and is navigable for several hundred miles.

The climate of Victoria is temperate, but liable to sudden changes, and hot winds blow at intervals from November to February, causing great discomfort. The hottest period is in January and February, when the thermometer sometimes rises to 108° in the shade.

Industry and Trade. Victoria is the principal gold-producing colony of Australia, the yearly output being valued at \$9,000,000. Tin, antimony, copper and coal are also among the minerals worked.

General farming is quite extensively followed. The chief crops among the cereals are wheat, oats and barley. Hay is grown, and forage crops are also raised. Among fruits, grapes take the lead, and considerable attention is given to the manufacture of wine. Stock raising is important, and wool

growing is the chief branch of agricultural industry. The state has over 12,000,000 sheep, and the annual output of wool averages over 100,000,000 pounds.

The manufacturing industries are quite generally distributed, and include the manufacture of textiles, machinery, food preparations, butter and cheese and malt and spirituous liquors.

Most of the commerce is with Great Britain, and in its foreign trade Victoria is the second state of the commonwealth. The chief exports are wool, gold, dairy products and wheat. Railway lines extend to all the most important trade centers and connect these directly or indirectly with Melbourne, the chief city and commercial port. In all, there are about 4,000 miles of railway in the state.

Government. The governor, who is the chief executive officer, is appointed by the British sovereign. The legislature consists of a council of thirty-four members, who are chosen for six years, and an assembly of sixty-five members, elected for three years. Suffrage is granted to men and women on equal terms. Melbourne, the capital, is the second largest city of Australia, following Sydney. Population of the state, 1911, 1,315,551; in 1921, 1,531,529.

Related Articles. Consult the following titles for additional information:

| | |
|-----------|--------------|
| Australia | Melbourne |
| Ballarat | Murray River |

VICTORIA, B. C., capital of the province, is situated on the southeastern extremity of Vancouver Island, on the Strait of San Juan de Fuca, seventy-five miles northwest of Seattle, Wash. It is within three miles of Esquimalt, a naval base with one of the finest harbors on the Pacific coast. The city is well laid out and has good streets; excellent roads connect it with the surrounding country. The public buildings include the parliament house, the government offices and the provincial museum and library, the city hall, the courthouse, a marine hospital, the Anglican Cathedral and exposition buildings. Victoria is an important industrial center and has lumber mills, shipyards, potteries, powder works and other manufactories. It also has a large trade in salmon. Originally a post of the Hudson's Bay Company, it was incorporated as a city in 1862, and until the founding of Vancouver was the largest Canadian city on the Pacific coast. Its import trade is large, the value of products shipped

in yearly being about \$10,000,000. Population in 1921, 38,775.

VICTORIA CROSS, the most highly-prized British military and naval decoration, instituted as a recognition of valor in the presence of the enemy at the close of the Crimean War in 1856. It is granted to soldiers and sailors of any rank, including native officers and men of the Indian army. Up to 1913 only 522 crosses had been awarded; this number was considerably increased during the World War. The cross is the more valuable because it is awarded sparingly, and only for the most conspicuous acts of bravery and devotion to the Empire.

VICTORIA FALLS, a celebrated cataract in the Zambezi River, in Rhodesia, South Africa, discovered by Livingstone in 1855 and named by him in honor of Queen Victoria. After flowing for a long distance over a rough and broken plateau, covered with brush and stunted trees, the Zambezi plunges suddenly into a chasm nearly 400 feet deep. The falls, 3,000 feet in width and 360 feet in height, are the most magnificent in the world. At low water the fall is broken by projecting rocks and is described by an observer as resembling a film of delicate lace, but when the river is swollen during the rainy season, an unbroken sheet of water is hurled over the ledge, forming a cataract unequaled elsewhere in the world. The roar of the falls can be heard for twenty miles, and the cloud of spray thrown into the air is visible for ten miles. Because of this cloud, the natives named the cataract *Mosi-oa-tuni*, which means *roaring smoke*.

Below the cataract the Zambezi flows for a long distance through a narrow gorge, with nearly perpendicular walls of basalt. Just below the falls the Cape-to-Cairo Railway crosses the river on a magnificent steel bridge, 600 feet long and 420 feet above the water; it is the highest structure of the kind in the world. From this bridge a magnificent view of the falls is obtained.

VICTORIA NYAN'ZA, the largest lake in Africa, having a surface area of 26,000 square miles and after Lake Superior the largest body of fresh water in the world. It was discovered in 1858 by Captain Speke and named for Queen Victoria (*nyanze* is the local word for *lake*). It lies about 600 miles from the eastern coast and is crossed by the equator. It is fed by several streams, the most important being the Kagera to the

west, and drains an area of 92,000 square miles, where there is an annual rainfall of seventy-five inches. It is the principal source of the Nile River. As the Nile issues from the lake it forms the Ripon Falls, which are about 1,200 feet across. The lake is rocky and shallow and is dotted with islands. Port Bell, Entebbe and Jinja are the principal ports.

VICUNA, *ve koo'nyah*, a small animal of the camel family, somewhat resembling a wild goat or an antelope, which inhabits the Andes Mountains in South America. It is economically valuable because of its soft, silky, brown wool, which is of better quality even than that of the alpaca. It is commonly seen in herds of from six to fifteen females and one male. The animals are very timid, and have never been domesticated.

VIENNA, *ve en'nah*, the capital and largest city of the new republic of Austria, before the great war the fourth city in Europe in population, and one of the most pretentious capitals in the world. The day of Vienna's outstanding influence is past. By the terms of the peace treaty of 1919 Austria was reduced to a state of less than 8,000,000 inhabitants, and out of the old domain were erected several independent states with capitals of their own. It is not to be expected that the new Austria can support a capital of over 2,000,000 inhabitants, which was the population of Vienna at the outbreak of the war.

The city was formerly the center of Austrian social life and gayety, of the national administration, of art, education and music, of banking, commerce and finance. As a result of the disastrous war the wealth of Vienna disappeared, as did the court and the prestige of the aristocracy. The people who were left were burdened with debts and physically weakened by the privations of the war.

General Description. The city is situated on the south bank of the Danube, 330 miles south-southeast of Berlin and 630 miles east of Paris. The site is picturesque, for the plain on which the city was built is bordered by mountains, whose bases are covered with magnificent forests. A branch of the Danube, known as the Danube Canal, traverses the city from northwest to southeast. This canal is spanned by many bridges, and by the construction of a lock a section of it has been made into a capacious harbor.

Vienna is built upon the plan of the old European cities, containing an inner, or central city, surrounded by suburbs, which are now incorporated in the city and divided into districts. The old town, or Innere Stadt, occupying the center of the city, was formerly enclosed by a wall and fortifications. In 1858 these were removed, and a magnificent boulevard, the Ringstrasse, was erected upon their site. This is one of the finest streets in Europe, and upon it are found most of the important public buildings of the city. In the newer parts the streets are broad, and there are a number of boulevards and parks. Chief among these is the Prater, in the southeastern quarter, having an area of over 4,000 acres. The streets, parks and bridges are decorated with numerous statues and monuments. The buildings are noted for their beauty and elegant ornamentation, making Vienna, from the standpoint of architecture, one of the finest cities of the world.

Buildings and Monuments. In the center of the Innere Stadt is the Cathedral of Saint Stephen, which dates from the thirteenth century and is one of the finest Gothic structures in Europe. Other buildings of importance in and about the Ringstrasse are the imperial palace, in the southeastern quarter, noted for its age and size, rather than for its beauty; the townhall, a magnificent building adorned with many statues; the imperial museums of natural history and of art, with a monument of Maria Theresa between them; the houses of parliament; the palace of justice; the imperial opera house; a number of churches, noted for their statuary and paintings and the University of Vienna, with its numerous structures. Among the noted monuments not already mentioned are the monument to Mozart, the equestrian statues of Archduke Charles and Prince Eugene of Savoy and the monument to the Archduchess Christine.

Institutions. The educational institutions include the University of Vienna, a polytechnic institute, an agricultural college, a geological institute, the academy of sciences, the conservatory of music and the military geographical institute, besides a large number of trade schools, which prepare their students for such occupations as printing, bookbinding and other mechanic arts. The imperial library contains 900,000 volumes, besides a large number of manuscripts and engravings, and the library of the university has 650,000

volumes. These are supplemented by other libraries in the various institutions. The collections in the academy of art and the museums are among the best in the world, while the armory contains a large collection of weapons and other instruments of war. The chief charitable institution is the general hospital, one of the largest and most famous institutions of its kind in the world; before the war medical students were drawn to it from all over Europe and America. There are also an asylum of the insane, and a number of smaller hospitals and homes for the blind and the deaf and dumb.

Industries. Vienna is situated at the crossing of the great commercial routes from London, Berlin and Paris to Constantinople and from Petrograd to Rome. Its situation made it an important industrial and commercial center. Among the leading industries were the manufacture of silks, woolens and other textiles, clothing, machinery, railway cars, locomotives and supplies, musical instruments, furniture, scientific and surgical instruments, pottery, jewelry, leather goods, malt liquors and numerous other products. Before the war the city had an extensive trade with the surrounding country and with the leading commercial centers of Europe, but during the war this trade was almost entirely cut off.

History. Vienna occupies the site of an ancient Roman camp, known as Vindobona. It first became prominent as the capital of the duchy of Austria, and for about 150 years from the middle of the sixteenth century it was the capital of the German Empire. It was the seat of the celebrated Congress of Vienna that reorganized Europe after the fall of Napoleon. Population in 1911, 2,031,498; by the official census of 1920 it was given as 1,841,326. See AUSTRIA; AUSTRIA-HUNGARY; WORLD WAR; VERSAILLES, TREATY OF.

VIENNA, CONGRESS OF, a convention of representatives of European powers which assembled late in 1814 to reorganize the political system of Europe after the close of the Napoleonic wars. It was a brilliant assemblage of crowned heads, prominent diplomats and statesmen, of whom Czar Alexander I of Russia, Prince Metternich, the Austrian Minister of State, Prince Talleyrand of France, Castlereagh and Wellington of Great Britain and Hardenberg and Humboldt of Prussia were among the most powerful.

By the provisions of the Congress of Vienna, France was deprived of the territory conquered by Napoleon; Holland and Belgium were united into a single kingdom under the House of Orange; Norway and Sweden were joined under a single ruler, one of Napoleon's generals, and the independence and neutrality of Switzerland were guaranteed. The German states were loosely confederated under a diet at Frankfort. In Italy the old governments, consolidated under Napoleon, were restored. Poland was reestablished as a constitutional kingdom dependent upon Russia. Great Britain found compensation in the extension of its colonial possessions.

The Congress of Vienna is criticized for its blindness to the spirit of nationalism that had been awakened throughout Europe by the events of the French Revolution. It defined boundaries arbitrarily, without consulting the peoples concerned, thus laying the basis of many disputes and future wars. The diplomatic method known as the balance of power, brought into prominence by this Congress, led to unending international complications that finally resulted in the bursting forth, in 1914, of the World War, the most widespread and violent conflict in all history.

VI'KINGS. See NORTHMEN.

VILLA, *veel' ya*, FRANCISCO, or PANCHO (1877-1923), a Mexican revolutionist and bandit, born at Las Nieves. His real name is DOROTEO ARANGO; he called himself *Villa* after joining the Madero revolution. He had no education, and became a bandit and outlaw at a early age; long before the Madero uprising President Diaz had offered a reward for his capture. In 1914 he joined Carranza in a revolution against Huerta, and the next year he started a revolution against Carranza, gaining control of parts of the states of Sonora, Chihuahua and Sinaloa.

In March, 1916, Villa invaded New Mexico, and raided the town of Columbus. United States troops under Pershing made an expedition of 500 miles into Mexico to capture Villa, but he fled to the mountains and escaped. After the troops were withdrawn, in 1917, he resumed his depredations, but did not invade the United States again during the period of the World War. In the summer of 1919, however, his attitude became very threatening, and an American patrol crossed the border. In 1920, after the deposal of Carranza, Villa came to terms with the new government, which gave him

a money allowance and a military command. SEE MEXICO; UNITED STATES; CARRANZA.

VILLEINS, *vil' linz*, a class of feudal serfs, who were allowed to hold portions of land at the will of their lord, on condition of performing menial and non-military services. It frequently happened that lands held in villeinage descended in uninterrupted succession from father to son, until at length the occupiers or villeins became entitled, by prescription or custom, to hold their lands so long as they performed the required services. And although the villeins themselves acquired freedom, the villein services were still the condition of the tenure. These customs were preserved and evidenced by the rolls of the several courts in which they were entered, or by the immemorial usage of the several manors in which the lands lay. And as such tenants had nothing to show for their estates but the entries into those rolls, or copies of them, they at last came to be called *tenants by copy of court roll*, and their tenure was known as a *copy-hold*. See FEUDAL SYSTEM.

VIL'LI, minute projections covering the mucous lining of the small intestine. Each villus contains an artery, a vein, a capillary, or a network of capillaries, and lacteal. The function of the villi is to absorb the nutritious matter from the digested food in the intestines, after which the digested fats are carried to the thoracic duct, and the sugars, water, proteids and inorganic salts are carried by the portal vein to the liver. In constipation the villi are submerged by waste matter, and the absorption of food matter by them is made difficult or impossible.

VIL'NA, RUSSIA, a city of about 200,000 population, situated on the navigable Vilna River between Petrograd and Moscow. It is an old city, dating from the tenth century. Before the annexation of Lithuania by Russia in 1795, it was the capital of that country. It has long been an ecclesiastical and educational center. It is surrounded by an agricultural country and carries on commerce in grain and timber. In April, 1919, Vilna was seized from the Bolshevik forces by a Polish army. See LITHUANIA.

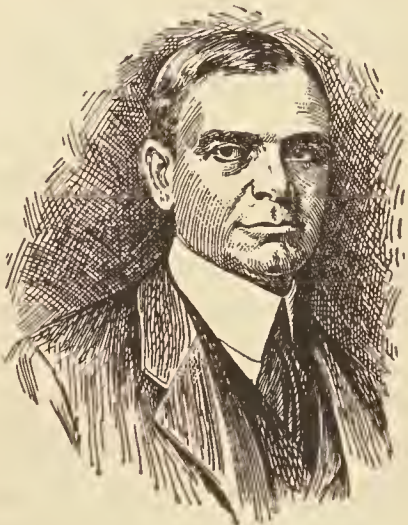
VINCENNES, *vin senz'*, IND., one of the oldest towns in the United States, the county seat of Knox County, 117 miles southwest of Indianapolis, on the Wabash River and on the Vandalia, the Baltimore & Ohio Southwestern, the Cleveland, Cincinnati, Chicago &

Saint Louis, and the Chicago and Eastern Illinois roads. It is in an agricultural, lumbering and coal-mining region and has manufactures of flour, lumber and clay products, novelties, paper, stoves and farm and mining implements.

It is the seat of the Vincennes University, Saint Rose Female College, a cathedral library and a public library. Other interesting features are the house in which William Henry Harrison lived when he was governor of the territory, the old legislative house, the courthouse, the city hall, the first in Indiana, the Federal building, the Y. M. C. A. building, the Vincennes Sanatorium, Harrison Park and several Indian mounds near the city.

Vincennes is located on the site of an ancient Indian village, called Chip-kaw-kay. The French erected a fort here about 1702, and a permanent settlement soon grew up. It was first called "The Post," but was later given its present name, in honor of its founder, François Morgan de Vinsenne. The place was taken by the British in 1763, was captured by Virginia troops under Colonel George Rogers Clark in 1779 and was turned over to the United States in 1783. It was the capital of Indiana Territory from 1801 to 1816 and was made a city in 1856. Population, 1910, 14,895; in 1920, 17,210, a gain of 16 per cent.

VINCENT, GEORGE EDGAR (1864—), an American educator and sociologist, son of Bishop John H. Vincent, born at Rockford, Ill. After his graduation from Yale University in 1885 he



GEORGE E. VINCENT

traveled in Europe and the Orient and then engaged for a time in journalistic and literary work. In 1888 he became vice-president of the Chautauqua system and in 1907 president of the Chautauqua Institution. At the same time he was a member of the faculty of the University of Chicago, having been appointed in 1894. In 1904 he was made professor of sociology; from 1900 to 1907 he was dean of the junior colleges, and from 1907 to 1911, dean of the faculties of arts, literature and science. In 1911 professor Vincent became president of the Uni-

versity of Minnesota, and in 1917 resigned from that post to accept the presidency of the Rockefeller Foundation (which see). He has written *Social Mind* and *Education* and, with A. W. Small, *An Introduction to the Study of Society*.

VINCENT, *vin'sent*, JOHN HEYL (1832–1920), a Methodist Episcopal bishop, best known as one of the founders of the Chautauqua Assembly movement. He was born at Tuscaloosa, Ala., and was educated at Lewisburg (Pa.) Academy and at Wesleyan Institute, Newark, N. J. Entering the New Jersey Conference in 1853, he preached four years in the East, and was then transferred to the Rock River Conference, in Northern Illinois. In 1865 he established the *North-west Sunday-School Quarterly*, and the following year *The Sunday-School Teacher*. From 1868 to 1884 he was corresponding secretary of the Sunday-School Union of his denomination and editor of its publications. Ten years previous to the latter date he had helped to lay the foundations of Chautauqua Institution and in 1878 had become its chancellor. He was elected bishop in 1888, and twelve years later was appointed resident bishop in Europe, remaining abroad four years and then retiring from the active episcopate in 1904. His publications include *The Chautauqua Movement*, *The Church School and Its Officers*, *Studies in Young Life*, *A Study in Pedagogy* and *Family Worship for Every Day in the Year*. See CHAUTAUQUA INSTITUTION.

VINCI, *vin'che*, LEONARDO DA (1452–1519), one of the foremost scholars of the Italian Renaissance and one of the greatest artists of all time. His place in history is unique, not only because of the high quality of his art, but because of the versatility of his genius and his intellectual influence on his contemporaries. Such a combination of artistic and scientific capacities has not been known in any other man. Leonardo was distinguished not only as a painter, but as a sculptor, an architect, a musician and an engineer. As a philosopher and man of science he was the forerunner of Galileo, Bacon and Descartes. He was acknowledged the greatest physicist of the fifteenth century. He "united a remarkable knowledge of mathematics with the most admirable intuition of nature," and he "anticipated the grandest discoveries of modern science," says a modern scholar.

Leonardo was born at the small town of Vinci, near Florence, the son of a Florentine notary. In his youth he was distinguished for his great personal beauty, physical strength and eagerness for knowledge. After studies with the celebrated painter and sculptor Verrocchio he became an independent artist, and from the age of twenty onward enjoyed the most distinguished patronage; Lorenzo de' Medici, Ludovico the Duke of Milan and Francis I of France treated him with the highest honor. As architect, engineer, painter sculptor and decorator, he received numerous commissions, and in everything he undertook he aimed at perfection.

His supreme masterpiece, *The Last Supper*, painted on a wall of the monastery of Santa Maria delle Grazie, at Milan, represents Christ, seated with his disciples, at the dramatic instant following His announcement that one of the twelve should betray Him. In characterization and dramatic and spiritual significance it surpasses all other treatments of the same subject. Unfortunately, the picture has been exposed to dampness and smoke, and these elements, together with clumsy attempts to restore it, have obliterated much of its original beauty. The most celebrated of Leonardo's easel pictures, that known as *Mona Lisa*, is the portrait of a prominent Florentine lady, perhaps the most famous portrait in the world (see PAINTING). *The Virgin of the Rocks*, *The Virgin*, *Saint Anne and Christ* and *John the Baptist*, all in the Louvre, are his other chief masterpieces. Leonardo spent his last years in France in the service of Francis I. He wrote a celebrated treatise on painting.

VIN'EGAR, a sour liquid whose active principle is acetic acid, is made from the juices of fruits and vegetables and from almost any other liquid that will ferment. It is used as a condiment and in the pickling and preserving of foods. The vinegar of commerce is made from wine, cider or malt exposed to the air, usually at a heightened temperature until the alcohol which it contains turns into acetic acid. By far the largest part of the vinegar used in the United States is made from cider. Ohio, New York, Michigan and Missouri lead in the industry.

Cheap grades of vinegar are usually given their sour taste by the addition of sulphuric acid. This adulterated product is very unhealthful, and should not be purchased. The presence of the acid can be detected by

boiling a mixture of vinegar and potato starch, and when this becomes cool, adding a small quantity of iodine. If the vinegar is pure, the mixture will turn blue on the addition of the iodine; if sulphuric acid is present, the color will remain unchanged.

VIN'LAND, the name given to that part of North America which was visited by Norsemen several centuries before Columbus made his famous voyage. As early as the tenth century a Norwegian viking, Bjarni Herjulfson, was driven by storms to the mainland near Greenland, and in the year 1000 Lief Ericson landed on the continent, probably somewhere between Delaware and Labrador. He named the region *Vinland* (also spelled *Vineland*) because of the numerous wild grapevines there. It is believed, however, that the Norsemen did settle at some point in America and that they built homes, which they deserted because of the hostility of Indians. The former popular belief that the old mill at Newport and the Dighton Rock are evidences of their visit has long since been discarded, the former having been erected by an early governor of Rhode Island and the latter being the work of Algonquin Indians.

VI'OL, a class of ancient musical instruments, which may be regarded as the precursors of the modern violins. They were fretted instruments, with three to six strings, and were played with a bow. There were three instruments in a set, differing in pitch; these were the treble, tenor and bass viols, and in concerts they were commonly played in pairs—two treble, two tenor and two bass. The bass viol, or *viol da gamba*, developed into the modern *violoncello*.

VI'OLET, the popular name given to a genus of plants, of which there are many species. They are favorite flowers in all northern and temperate climates, and many of them are among the first to make their appearance in the spring. The greatest favorites are the common sweet violet and the heart's-ease, the former being especially esteemed for its fragrance. The well-known pansies, so common as garden flowers, are but varieties of one species, produced by cultivation. In different localities, various species are called johnny-jump-ups. The so-called dog-tooth violet belongs to the lily family.

VIOLIN', a musical instrument, consisting of four catgut strings, the lowest of

which is covered with silvered copper wire, stretched, by means of a bridge, over a hollow wooden body, and played with a bow. It is considered the most perfect of musical instruments, on account of its capabilities of fine tone and expression and of producing all the tones in any scale in perfect tune. It forms, with the viola, the violoncello, or bass violin, and the double bass, the main element of all orchestras.

The principal parts of the violin are the *scroll*, or *head*, in which are placed the pins for tuning the strings; the *neck*, which connects the scroll with the body, and to which is attached the *fingerboard*, upon which the strings are stopped by the fingers of the left hand, as it holds the neck in playing; the *belly*, over which the strings are stretched, and which has two *f*-shaped sound holes, one on each side; the *back*, or under side; the *sides*, or *ribs*, uniting the back and belly; the *tailpiece*, to which the strings are fastened, and the *bridge*. The back, neck and sides are generally of sycamore, the belly of deal, the fingerboard and tailpiece of ebony. Almost all the pieces are put together with glue.

The four strings of the violin are tuned at G, on the upper space of the base staff, D, A, E, reckoning upward. Every intermediate semitone in a compass of $3\frac{1}{2}$ octaves may be produced by stopping the strings with the fingers, and the compass may be almost indefinitely extended upward by touching the strings lightly. The *viola*, or tenor violin, has four strings, tuned to C (in the second space of the base staff), D, A, G, reckoning upward; it is an octave higher than the violoncello and a fifth lower than the violin.

The art of violin-making reached its highest development in the sixteenth, seventeenth and eighteenth centuries. The greatest of the world's violin makers, Stradivarius, Amati and Guarneri worked at Cremona, Italy. Very fine instruments were also made at the same time in France and Germany.

VIOLONCELLO, *vi o lon chel' lo*, also called **CELLO** (*chel'o*), a large musical instrument of the violin class, intermediate between the violin and the double bass. The performer rests one end of the instrument on the floor between his knees, and supports the neck with his left hand. There are four gut strings, the two lowest covered with silver wire. They are tuned in fifths—C, G, D, A. The instrument has a compass from C to A₄.

The higher notes are in the treble clef, the lower in the bass. Although the instrument is much larger than the violin, the cello bow is shorter. Comparatively little solo music has been written for the cello.

VI'PER, the name applied to a family of venomous reptiles found in tropical and temperate regions of Europe, Asia and Africa. This snake has a flat, triangular head, which in most species is covered with scales. The pupil of the eye is like a cat's eye. The *common viper* is rarely more than two feet long, is usually brownish-yellow, with black triangular spots on its sides and zigzag lines on its back. Its bite, as a rule, is not fatal, but may cause pain and fever. It is the only poisonous snake in Great Britain. Another species, called the *sand viper*, having a small fleshy horn on its nose, is found along the shores of Mediterranean countries. In Africa occur the *death adder*, *puff adder* and *saw viper*. The *horned viper* of the Egyptian desert which preys at night and burrows in the sand during the day, is much feared on account of its bite, which is usually fatal. The largest and most deadly of all vipers is *Russell's viper* of India. It is five feet long, and its poison is invariably fatal.

VIRCHOW, *veer'Ko*, RUDOLF (1821–1902), a German physician and pathologist, born in Pomerania. He studied medicine at Berlin and early became famous as a lecturer on pathological anatomy at Berlin University. His advanced liberal opinions during the movement of 1848 induced the government to deprive him, temporarily, of his appointment. In 1849 he accepted a chair at Wurzburg, where he remained seven years, at the end of which time he returned to Berlin as professor in the university and director of the pathological institute attached to it. In 1858 he published *Cellular Pathology*, in which he showed that pathological tissues are a collection of cells. Virchow rendered immense service to medical science by his discoveries in regard to inflammation, ulceration, tuberculosis and other diseases, and he has had great influence on the whole of modern medicine, including hospital reform and sanitary science. He was a voluminous writer, not only on scientific, but also on political subjects, and many of his works have been translated into the English and other European languages.

VIR'EO, a common name of a small family of birds, whose plumage is generally of a

greenish shade. They are sometimes called greenlets, and about a dozen species are found in the United States. Many of the birds are singers, the songs of the several species varying considerably. The birds feed exclusively upon insects, and thus render a distinct service to the farmer. The nests of all are similar, being cup-shaped and constructed of ribbonlike materials.

The best-known species in the United States is the *red-eyed vireo*. It is about six inches long, has bright olive-green back and tail, and a double line of ash and white over the eye, the iris of which is red. The *yellow-throated vireo* has a bright, olive-green back and yellow throat and breast. The *warbling vireo* is of plain plumage, but has a charming song.

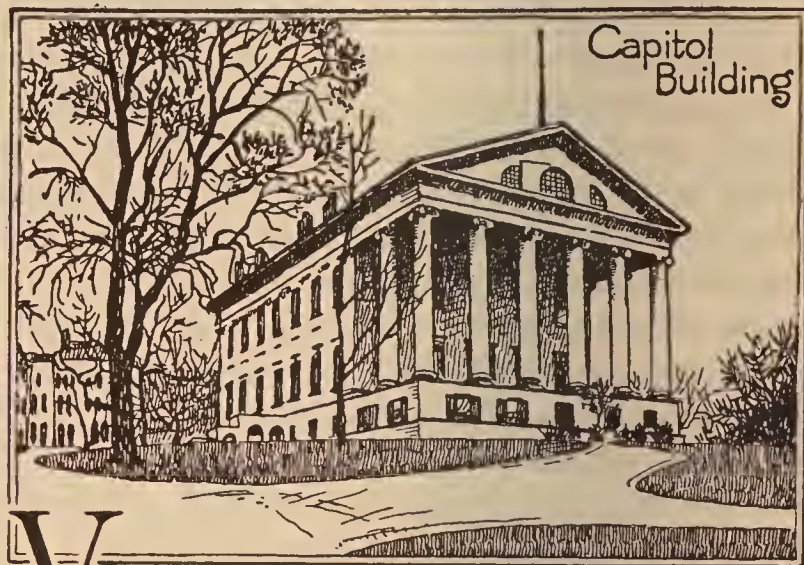
VIRGIL, *vir'jil*. See VERGIL.

VIRGIN ISLANDS OF THE UNITED STATES, a group of islands purchased by the United States from Denmark in 1917 for \$25,000,000. Before the change of ownership they were known as the DANISH WEST INDIES. Geographically the Virgin Islands are a part of the Leeward Islands, which, with the Windward Islands to the south of them, constitute the Lesser Antilles, stretching southward from Porto Rico in a great semicircle nearly to the coast of South America.

The Virgin Islands consist of three main islands—Saint Croix, Saint John and Saint Thomas—and about fifty smaller ones, only five of which are inhabited. The total population of the three larger islands is about 26,000, and the combined area is about 132 square miles. Saint Croix has an approximate area of eighty-four square miles and a population of 14,901. Saint Thomas is twenty-eight square miles in extent, and is inhabited by 10,191 persons; Saint John, with an area of twenty square miles, has 959 inhabitants. (The population statistics are from the official census report of 1917.) The great majority of the people are of negro or of mixed white and negro blood.

These islands are of volcanic and coral origin, and are of slight importance industrially, but because of their strategic value as outposts for the protection of the Panama Canal their purchase by the United States was highly approved by all Americans. The harbor of Charlotte Amalie, the chief town on Saint Thomas, is one of the best in the West Indies, and the town is an important

calling station for vessels plying between Europe and the Americas, especially for those bound for the Panama Canal. Vessels not only may secure coal, oil and other supplies, but find in the harbor a safe refuge from storms. The Virgin Islands carry on a small import and export trade, sending to the United States sugar, hides and skins and cabinet woods. They receive coal, foodstuffs, boots and shoes, refined sugar and other commodities used in everyday life. See SAINT THOMAS; TRAVELS IN DISTANT LANDS, subhead, *Among the Lesser Antilles*.



VIRGINIA, *vir jin' e ah*, one of the thirteen original states of the American Union, belonging to the South Atlantic group. In colonial days it was referred to in official documents as the "Dominion of Virginia," a name that survives in its popular designation, the OLD DOMINION. Virginia is the picturesque name given the colony by Sir Walter Raleigh, who bestowed it in honor of Elizabeth, the "Virgin Queen" of England. As colony and state Virginia has had a unique and honored place in American history. On its soil in 1607 was planted the first permanent English settlement in the New World. A leader in the struggle for independence, it gave the American nation its first President and seven others, besides Patrick Henry, John Marshall, Richard Henry Lee, John Randolph and other distinguished orators and statesmen. Virginia's honorary title, "Mother of Presidents," is well deserved.

Location and Area. The state is the most northerly of the South Atlantic group. It has the shape of an irregular triangle, with the apex pointing northward, and Tennessee and North Carolina lying along the base, on the south. The sloping western boundary lies adjacent to West Virginia and Kentucky;

Maryland is at the extreme north and along the northeast; Chesapeake Bay and the Atlantic Ocean bound the state on the east. With an area of 42,627 square miles, Virginia is the thirty-third commonwealth in the Union in size. Of its area, 2,365 square miles are water surface, as the state has numerous landlocked harbors and rivers. The states nearest it in size are Tennessee, with an area of 42,022 square miles, and Ohio, which covers 41,040 square miles.

People and Cities. In 1920 Virginia had 2,309,187 inhabitants and an average density of 57.4 persons to the square mile, and was twentieth in rank among the states in population. The population on Jan. 1, 1910, according to the Federal census, was 2,061,612.

About one-third of the people are of negro blood; the proportion of foreign-born to the total white population is about five per cent, and of the native-born population nine-tenths are Virginians by birth. Russians, Germans, English, Irish and Scotch are the most prominent of the foreign-born groups.

The principal religious bodies are the Baptist, Methodist, Presbyterian, Roman Catholic and Episcopalian.

Richmond, with a reported population of 171,667 in 1920, is the capital and largest city. It is the only municipality with over 100,000 inhabitants. The cities next in size are Norfolk, Roanoke, Portsmouth, Lynchburg and Petersburg.

Surface and Drainage. There are six natural divisions of Virginia, which differ greatly in scenery, soil and productions. Named in their order, from east to west, they are the tidewater country, middle Virginia, the Piedmont section, the Blue Ridge, the valley and Appalachia. The tidewater country consists of lowlands, extending about 100 miles westward from the ocean; it is divided by Chesapeake Bay and deeply cut by smaller bays, estuaries and rivers. Middle Virginia, extending from the tidewater to the eastern outlying spur of the Appalachian system, is an undulating plain, increasing in elevation toward its western limits. The Piedmont section is a narrow belt, lying at the foot of the Blue Ridge. Its mountains and hills extend in every direction, enclosing picturesque valleys of every shape. The Blue Ridge, from three to twenty miles wide, broken by gorges and a series of beautiful peaks and expanding into an elevated plateau toward the south, is the principal range.

The highest peak is White Top (5,530 feet), near the Tennessee line. The valley, between the Blue Ridge and the Alleghanies, is the garden spot of the state. The limestone formations in the central part of this valley contain several noted caverns, besides the famous Natural Bridge, considered one of the wonders of the world. Appalachia, the westernmost section, is a mountainous region, crossed by numerous narrow ranges, inclosing troughlike valleys.

The Potomac, which forms a portion of the boundary between Virginia and Maryland, drains the northern and eastern parts of the state. Its chief tributaries from Virginia are the South Branch and the Shenandoah. The important streams flowing into Chesapeake Bay, from the north southward, in their order, are the Rappahannock, the York and the James. The Roanoke flows into the state near the central point of the southern boundary and proceeds eastward for a number of miles and then returns to North Carolina. This, with its tributaries, drains the south-central region. The southwestern part is drained into the Tennessee, and the northwestern, into the Ohio. The chief streams flowing through this region are the Big Sandy, which forms a part of the boundary between Virginia and Kentucky, and the Great Kanawha. Many of the mountain streams are characterized by deep gorges and beautiful waterfalls.

Climate. The climate is diversified according to the natural divisions of surface. In general, the state is free from intense heat and severe cold, although sudden changes are common in most localities. The mean annual temperature is 56°. The average annual rainfall is forty-four inches. The climate is healthful the year round.

Mineral Resources. Virginia has a wide variety of minerals, and the annual output of all products is valued at over \$16,000,000. In the southwestern part, in the Appalachian region, there are valuable coal mines now yielding close to 10,000,000 tons a year. Coal is the most important of the minerals, and is followed by stone products, notably granite and other building stones, soapstone, marble and talc. Virginia is the first state in the production of soapstone. Clay products and lime are next in order of importance; among the former common brick constitutes about eighty per cent of the total product.

The state is among the first ten in the production of iron, and is first in the production of iron pyrite, used extensively in the manufacture of sulphuric acid. Other minerals of commercial value include salt, sand and gravel, copper, zinc and lead. There are numerous mineral springs distributed over the state, many of which are frequented as health resorts because of their medicinal properties. Hot Springs, seventy-five miles north of Roanoke, is one of the best known.

Agriculture. Agricultural pursuits occupy over half the population of the state, and agriculture is the leading industry. Climatic conditions are favorable in nearly all parts, and varieties of soil make possible a wide diversity of products. Along the eastern shore and in "Tidewater" Virginia there is a rich marl on which vegetables flourish, and there truck gardening is a highly profitable branch of agriculture. Peanuts are also raised in the east, as well as in a few other localities, and the yearly output is surpassed only by that of North Carolina. The great tobacco fields are in the central section, while the Piedmont region is famous for its orchards and grazing lands. In the fertile soil of the valley between the Blue Ridge and the Alleghanies abundant cereal harvests are produced.

In point of value and yield, corn is the most important of the large crops, and is followed by wheat, tobacco, hay and forage. In the output of tobacco Virginia is surpassed only by Kentucky and North Carolina; the annual crop is about 130,000,000 pounds. Potatoes are the most important vegetable product, the yearly output averaging about 18,000,000 bushels. There is also a small cotton crop. Among orchard fruits, apples lead, while strawberries are the most valuable small fruit. Dairying and the raising of horses, mules, cattle, sheep and swine are profitable enterprises; the state is noted for its thoroughbred horses.

Fisheries. Virginia is one of the leading states in value of oyster fisheries, as the tidal waters contain immensely profitable beds of that mollusk; about two-thirds of the value of the entire fishery output is represented by the oyster catch. Other products of the fisheries include shad, menhaden, alewives, clams, crabs and bluefish.

Manufactures. The leading manufacturing enterprises are those connected with the making of lumber and lumber products.

Second in importance is the manufacture of smoking and chewing tobacco. Richmond, which is the great center of this interest, has one of the largest tobacco factories in the United States. Flour milling, car construction and repair, leather tanning, the manufacture of fertilizer, paper making, the manufacture of cotton goods and of boots, shoes and the roasting of peanuts are other profitable lines of manufacture. Shipbuilding has developed extensively of late years, especially at Newport News, on Hampton Roads. Here is one of the largest shipyards in the country. Good water power, a wealth of raw materials and ready means of transportation are all favorable factors in the industrial growth of the state.

Transportation. There are over 4,700 miles of railroad in operation. Some of the main lines are the Chesapeake & Ohio, the Southern, the Norfolk & Western, the Baltimore & Ohio and the Atlantic Coast Line. Coastwise steamers run regularly between Virginia ports and New York, Philadelphia, Baltimore and Boston, and a line of freighters plies between Newport News and Liverpool. Hampton Roads, at the mouth of the James River, is one of the finest harbors along the Atlantic coast. There is a large interstate traffic, both by rail and water. The exports consist of tobacco and its manufactured products, lumber, grain, cotton, fruit, vegetables, coal, iron and naval stores, and the imports are manufactured goods and food products. Norfolk is the chief cotton shipping port, and Newport News the principal city for coal shipment.

Government. The legislature consists of a senate, which cannot exceed forty members or have less than thirty-three members, and a house of delegates of not less than ninety, or more than 100, members. The senators are elected for four years and the delegates for two. The executive department consists of a governor, a lieutenant-governor, a secretary of the commonwealth, an auditor, a treasurer, a superintendent of public instruction, an adjutant-general and commissioners of agriculture and insurance. The state courts consist of a supreme court of appeals, of five judges, chosen by the legislature for twelve years, and circuit courts, which are held in twenty-four judicial districts, each of which has a judge, elected by the legislature for eight years. Lower courts are established for cities and towns.

Education. The school system is under the control of a superintendent of public instruction, elected by the people, and a state board of education of eight members, which consists of the governor, the superintendent of public instruction, the attorney-general, three representatives of higher institutions, chosen by the legislature, and two superintendents chosen by this group of six. The revenue for school purposes is provided almost wholly by local and state taxation. Separate schools are maintained for colored and white children, and the law requires that each district must have at least five months' school during the year. Notwithstanding the difficulties under which Virginia labored after the Civil War, the schools of the state have made continual advancement.

The state maintains the University of Virginia, the Virginia Polytechnic Institute, the Virginia Military Institute, William and Mary College (the second oldest university in the United States), the Virginia Normal and Collegiate Institute, for men, at Petersburg, and a state female normal school, at Farmville. Various normal courses for whites are given in William and Mary College, and there are industrial schools for women at Harrisonburg and Fredericksburg. The University of Virginia, at Charlottesville, was founded by Thomas Jefferson; the military Institute, at Lexington, is called the "West Point of the South." Other institutions of higher learning include the following well-known schools:

Elizabeth College (for women) at Salem.
Hampton Normal and Agricultural Institute at Hampton (colored).

Hampden-Sidney College (for men) at Hampden-Sidney.

Hollins College (for women) at Hollins.

Martha Washington College (for women) at Abingdon.

Randolph-Macon College (for men) at Ashland.

Randolph-Macon Women's College at Lynchburg.

Richmond College (for men) at Westhampton.

Sweet Briar Institute (for women) at Sweet Briar.

Washington and Lee University (for men) at Lexington.

Westhampton College (for women) at Westhampton.

Institutions. The charitable and correctional institutions include the penitentiary at Richmond, the state farm at Lassister Post Office, the central hospital at Petersburg,

southwestern hospital at Marion, the western hospital at Staunton, the Virginia epileptic colony and the Virginia colony for the feeble-minded at Madison Heights, the Catawba sanatorium, the Virginia school for the deaf and blind at Catawba, and the Virginia school for the colored deaf and blind at Newport News.

History. The shores of Virginia were probably first visited by Sebastian Cabot in 1498, but no attempt at settlement was made until late in the following century, when Sir Walter Raleigh sent out several expeditions without success. The London Company was formed in 1606, and in the following spring a colony was established at Jamestown. Its leading spirit was Captain John Smith, whose energy and ability saved the settlement from early destruction by famine and Indian attacks. In 1610 Lord Delaware was sent to the colony as governor, and under his wise administration the settlement prospered. The year 1619 witnessed the introduction of negro slavery by Dutch traders, as well as the establishment of the first representative assembly in America. From this time on many immigrants, driven from England by the persecution of the Puritans, arrived in Virginia; but at the outbreak of the Puritan revolution, in 1642, William Berkeley, a staunch royalist, became governor and promptly suppressed the rebellious spirit. At this time an influx of royalists also began, which led to serious opposition to the Cromwell régime in England and to the joyful recognition of the return of the Stuarts to the throne. However, within the next few years discontent with economic conditions and the policy of the administration led to a serious insurrection, known as Bacon's Rebellion.

The eighteenth century in Virginia was marked by remarkable development, especially in the westward districts of the colony. During the French and Indian Wars, Virginia took an exceptionally prominent part, but it was also a leader in the resistance to Parliamentary taxation, its Assembly passing some of the earliest and most important measures of the period. Virginia also furnished some of the most conspicuous figures of the time, such as Washington, Jefferson, Patrick Henry, the Lees and Madison. The state took a prominent part in the Revolution, and the war ended on Virginia soil, in the surrender of Cornwallis. During the early years of the Republic, the state was

VIRGINIA

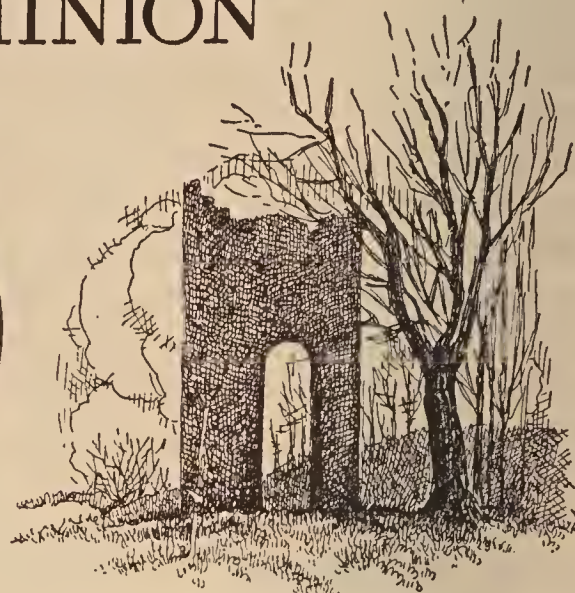
THE OLD DOMINION



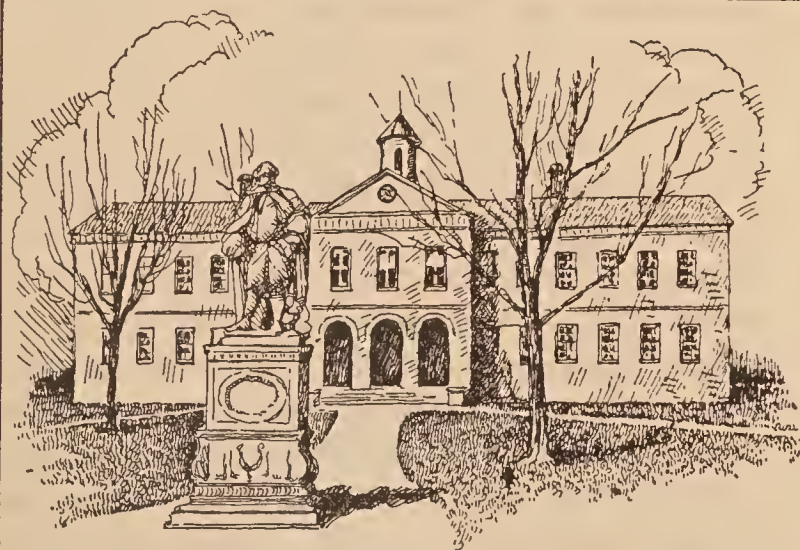
Houdon's Statue of Washington in the Capitol, Richmond



State Seal



All that is left of Old Jamestown



William and Mary College, Chartered in 1693



An Oyster Gatherer



Stratford, Westmoreland County, the Birthplace of Robert E. Lee



Jackson Monument, Richmond

Items of Interest on Virginia

The present state constitution was adopted in 1902.

The first white child born in the New World was born in Virginia and was named Virginia Dare.

The first exports of iron ore were sent from Virginia in 1608.

Twenty thousand pounds of tobacco were exported in 1619.

The first representative assembly in North America was the Virginia House of Burgesses, which met for the first time in 1619.

In 1648 the population of the colony was 15,000.

Seven states have been formed from territory which was formerly Virginia.

During the Civil War, of the six great campaigns in the East, four were on Virginia soil; the first Manassas Campaign (1861), the Peninsular battles (1862), the second Manassas, Fredericksburg and Chancellorsville (1862-63), and the great Battles of the Wilderness and campaigns around Petersburg (1864-65).

Questions on Virginia

What is the area of Virginia?

Name and describe the physical divisions.

Describe the drainage.

What is the character of the coast line?

What is the most valuable product of the fisheries?

How does Virginia rank as a tobacco-growing state?

Name four other important crops.

What is the most valuable mineral product?

Name two minerals in which Virginia leads all other states.

What are the leading manufactured products?

How many miles of railroad are there in the state?

What natural advantages has Richmond? What are its leading industries? What buildings of historical interest still stand in Richmond?

Name five prominent educational institutions.

stanchly Anti-Federalist, but six of the first ten Presidents were Virginians.

The state was at first favorable to the liberation of the slaves, but under the influence of states' rights theories and of agricultural conditions, it finally adhered to the policies of the lower South, and in the Civil War Virginia not only furnished the ablest generals in the Confederate armies, but became the battle ground of the great struggle. The state at first opposed secession, but finally passed the resolution, April 17, and from that time forward it was a continuous fighting ground between the two armies, many of the most important actions of the war, including Lee's surrender at Appomattox, taking place within its borders. A new constitution, framed in 1863, was adopted, but an amendment allowing negro suffrage was rejected in 1868, and the state was not readmitted until 1870. In 1902 a constitutional provision was adopted, limiting suffrage. Since the Civil War the state has been almost continuously Democratic in both state and national politics. Statewide prohibition became effective in 1916.

Related Articles. Consult the following titles for additional information:

CITIES

| | |
|--------------|------------|
| Alexandria | Petersburg |
| Danville | Portsmouth |
| Lynchburg | Richmond |
| Newport News | Roanoke |
| Norfolk | Staunton |

HISTORY

| | |
|----------------------|---------------------------------|
| Bacon's Rebellion | Jamestown |
| Bull Run, Battles of | Revolutionary War in America |
| Chancellorsville, | Smith, John |
| Battle of | West Virginia, sub-head History |
| Fredericksburg, | |
| Battle of | |
| Harper's Ferry | |

RIVERS

| | |
|--------------|------------|
| James | Roanoke |
| Potomac | Shenandoah |
| Rappahannock | |

TOPOGRAPHIC FEATURES

| | |
|---------------------|-----------------|
| Alleghany Mountains | Natural Bridge |
| Blue Ridge | Piedmont Region |
| Luray Caverns | |

VIRGINIA, MINN., a mining and lumbering city, fifth in size in the state, in Saint Louis County, seventy-five miles northwest of Duluth, and on the Great Northern, the Duluth & Iron Range, the Duluth, Winnipeg & Pacific, and the Missabe & Northern railroads. It is the distributing point for ores from the Vermilion and Mesaba ranges, one of the most important iron-producing regions of the world. Its saw mills turn out a million feet of finished white pine lumber daily. An extensive dairy industry is developing. The town was settled in 1892

and became a city in 1905. It has been twice burned by forest fires. There are a Federal building, a public library, a county courthouse and two parks. The workmen of the mills and mines are largely of European birth. Population, 1910, 10,473; in 1920, 14,022, a gain of 34 per cent.

VIRGINIA, UNIVERSITY OF, a state institution of higher learning, located near Charlottesville, four miles from Monticello, the old home of Thomas Jefferson. The university was founded by the state of Virginia through the influence of Jefferson, in 1819, and it owes much of its efficiency to his interest and care. In October, 1903, the government board created the office of president, and in June, 1904, Edwin Anderson Alderman was elected first president of the university. The institution is organized into academic, engineering, law, medical and agricultural departments. There are over one hundred instructors and over 3,500 students, and the library contains 120,000 volumes. The state of Virginia makes an annual appropriation for the maintenance of the university. Among the interesting buildings is the Rotunda, housing the library. The structure is modeled upon the Pantheon at Rome.

VIRGINIA CITY, NEV., third city in size in the state, the county seat of Storey County, fifty-two miles southeast of Reno, on the Virginia & Truckee railroad. The city grew up about the famous Comstock lode, the world's richest silver mine, discovered in 1859, and since that time having a consolidated output amounting to approximately a billion dollars. The settlement was first known as Ophir and later as Silver City. It received its present name from James Fenimore, an early settler, familiarly known as "Old Virginia." The city was incorporated in 1864. The population in 1880 was 10,917, the subsequent decrease being largely due to exhaustion of the lode and a decline in the price of silver. Population, 1920, 1,200.

VIRGINIA CREEPER, a shrubby, hardy climbing plant of the grape family. It is much grown on walls on the continent of Europe, in the British Isles and in America as an ornamental vine. The stem develops tiny rootlets along its entire length, and by means of these the vines, which often attain a great size and weight are upheld. The foliage is compound, five leaflets to a stem, and in autumn is brilliantly colored. The wild Virginia creeper is sometimes mistaken

for poison ivy, though the latter has three leaflets on a stem. Because of the little bunches of dark blue berries which appear in the fall the creeper is sometimes called *false grape*.

VIRGINIA RESOLUTIONS. See KENTUCKY AND VIRGINIA RESOLUTIONS.

VIRGO, *vur'go* (the virgin), the sixth sign of the zodiac, represented by the sign ♍. The principal star of this constellation is Spica, one of the lesser first-magnitude stars. The sun enters the constellation of Virgo about August 20th.

VIRUS. As the term is used in medicine, *virus* means disease poison, particularly the poison by which disease is conveyed from one person to another by contact. Formerly the application of the term was restricted to such diseases as measles, scarlet fever and smallpox, but the culture of any bacteria may be called a virus. The term is also applied to the vaccine used in vaccination.

Related Articles. Consult the following titles for additional information:

| | |
|-------------|-----------------|
| Antitoxin | Medicine |
| Bacteria | Vaccination |
| Germ Theory | Vaccine Therapy |

VISCOUNT, *vi'kount*, originally, in English usage, the officer who acted as deputy to a count or earl. As a hereditary title, it was first granted to John Beaumont, in 1440. A viscount is "Right Honorable" and is styled "My Lord." His wife is a *viscountess*, and his children are addressed as "Honorable."

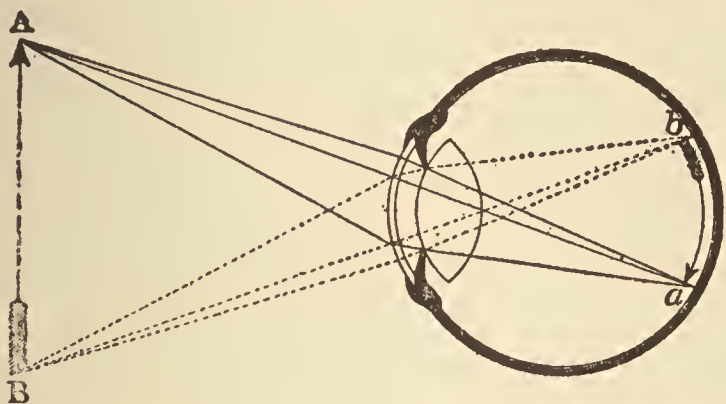
VISHNU, the second of the three great Hindu gods, by his special worshipers considered to be the greatest. In the early Vedas he was not regarded as the most exalted deity, but this rank was accorded to him by the later writers. The myths relating to Vishnu are characterized by the idea that whenever a great physical or moral disorder affected the world, Vishnu descended to set it right. He is generally represented as having four hands, in which he holds a conch-shell, blown in battle; a disk, the symbol of supreme power; a mace, the emblem of punishment, and a lotus, the sign of the creative power. Often he is shown as riding on a being, half man and half bird. See BRAHMA; SIVA.

VISIBLE SPEECH, a term applied by Prof. A. Melville Bell, its inventor, to a system of alphabetical characters, designed to represent every possible articulate utterance of the organs of speech. The system is based

or an exhaustive classification of the possible actions of the speech organs, each organ and every mode of action having its appropriate symbol. It is said that this invention is of great utility in teaching the deaf and dumb to comprehend spoken words and in aiding students of foreign languages to acquire their pronunciation from books.

VISIGOTHS, *viz' e goths*. See **GOTHS**.

VISION, *vizh' un*, or **SIGHT**, the act of perceiving objects through the eye. As an optical instrument, the eye closely resembles a camera, the cornea and crystalline lens



corresponding to the lens of a camera, and the retina corresponding to the screen. The rods and cones of the retina are sensitive only to the light, and their great number and variety enables the perfect eye to respond to light waves producing all colors. Rays of light entering the eye through the pupil are refracted, and they cross just back of the lens, the rays from *A* coming to a focus on the retina at *a*, and those at *B* coming to a focus at *b*, thus forming an inverted image on the retina. This may be observed by carefully cutting away the sclerotic coat from around the optic nerve of an eye taken from one of the lower animals, exposing the retina over an area about the size of a dime, and holding the eye towards a lighted lamp in a darkened room. An image of the lamp inverted on the retina can be plainly seen.

Physiology of Vision. Though the image may fall on the retina of a dead eye, there can be no vision in such case, as vision must depend upon the action of the living optic nerve.

The sensory fibers of the optic nerve originate in the optic centers of the brain. These fibers meet and cross at the base of the brain, forming the *optic commissure*, from which the optic nerves extend to each eye. In the commissure, half of the fibers cross, so that each optic nerve consists of half of the fibers from its own optic center and half of the fibers from the optic center on the opposite side of the brain. On reaching the eye, these

fibers are so distributed that those from the right optic center form the right half of the retina in each eye, and those from the left center form the left half. When the rods and cones are stimulated, impulses are transmitted along the optic nerves and optic tracks to the centers of unconscious sight in the brain. From these centers, other nerves extend to the centers of vision, and when the stimuli are strong enough to cause impulses to be transmitted to these centers, the person becomes conscious of them and sees the object. This is completed vision, and the image is retained in memory for a greater or less length of time, depending upon the strength of the stimuli and mental condition at the time the vision occurs. Consciousness and memory are mental activities, so that complete, intelligent vision depends upon mental, as well as physical action.

Related Articles. Consult the following titles for additional information:

| | | |
|--------|------|--------|
| Camera | Eye | Light |
| Color | Lens | Memory |

VIS'TULA, a river of Central Europe, rising in Eastern Silesia and flowing in a general northeasterly direction into the Frisches Haff and the Baltic Sea. Its delta encloses numbers of wooded islands, and its arms are subject to extensive change in their banks and the volume of their discharge. Among the cities on its banks are Cracow, Warsaw and Danzig. The river is about 630 miles in length and is navigable for a considerable part of this distance, though navigation is made difficult by constantly shifting sandbanks.

VITAL STATISTICS. See **POPULATION**, subhead *Vital Statistics*.

VITAMINES, *vi tam'inz*, a term derived from the Latin word for *life*, and applied to certain substances found in minute quantities in natural foodstuffs. They are believed to occur in the outer coat of rice and other grains, in uncooked milk, in butter and yeast and in fresh fruits and vegetables. Our knowledge of them is limited, but it is evident that they promote growth and help to regulate the body processes. Scientists are making extended investigations to discover the chemical formula of vitamins, and their exact relation to health and nutrition.

VIT'RIOL, **OIL OF**, the common name given to strong sulphuric acid. See **SULPHURIC ACID**.

VIVISECTION, *viv i sek'shun*, physiological investigation on living animals for the

purpose of discovering or demonstrating some fact of physiology. The term, which literally means *the cutting of the living*, was formerly employed to designate only cutting operations upon living animals for purposes of experiment. To-day it has a broader application and includes the inoculating with disease germs, experimenting with drugs, medicines, foods, with the effects of temperature upon living organisms, as well as cutting operations involving nerves, arteries and vital organs.

Vivisection has been generally regarded as the necessary means of acquiring physiological knowledge. Practically our entire knowledge of bacteriology and of the effects of drugs and medicines has been gained through this method of investigation, and nearly every operation and appliance to relieve pain or save life has been made possible through it. The facts concerning the circulation of the blood, respiration, digestion and the functions of the nervous system have been discovered by means of vivisection. The experiments are conducted in the most humane manner possible. The animals to be operated upon are placed under the influence of anaesthetics and suffer little or no pain. If an experiment necessitates the mutilation of the subject, the animal is put to death while it is still insensible.

VIZIER, *viz'yer*, a high official in Moham-medan countries, particularly the prime minister to the sultan, known as the grand vizier and possessing powers second only to the ruler himself.

VLADIVOSTOK, *vlah dye vohs tohk'*, SIBERIA, the chief commercial and naval port of the country on the Pacific, the eastern terminus of the Trans-Siberian Railway. The city lies at the southern end of a peninsula, on an arm of the Sea of Japan. It has a fine harbor, ice-free nine months of the year, and is connected by steamship lines with Japanese, Korean, North Siberian and North American ports. The city is impressive in appearance when viewed from the magnificent bay, but on closer inspection is disappointing. During the World War great quantities of war supplies were deposited at Vladivostok, and after the Bolsheviki overthrew the government in Russia the allies landed troops in the city to guard the supplies and maintain order. Vice was rampant in the troubled days of the war. Population, 1911, 91,464. See SIBERIA.

VOCATIONAL EDUCATION, that type of education designed to prepare young people for their life work. As the term is ordinarily used, it applies to education below college grade, but in its broadest sense it should include preparation for professions as well as occupations. Since the beginning of the present century, vocational education has made rapid progress everywhere in Europe and America.

When the United States entered the World War in 1917, the government at once discovered the dearth of skilled workmen in all the trades in which increased activity became at once a vital necessity. Especially was there a scarcity of mechanics, carpenters and shipbuilders, and to supply the demand, the government entered upon a campaign of industrial training on a scale never before undertaken. This campaign was conducted by the committee on Education and Special Training of the War Department. Colleges, technical schools and high schools followed the lead of this committee, and the progress in vocational education in the two years following the declaration of war exceeded that during the ten years preceding that date.

The labor conditions confronting the government led to a thorough study, on the part of educators, of the relation of the schools to this condition. Some of the most far-reaching causes of the lack of skilled workmen were found to be, first, dropping the old apprentice system without providing anything to take its place, and the rise of the factory system, involving the extensive use of machines which do not require skilled operatives; second, lack of education. Only one-fourth of the pupils who enter the primary grades of the public schools complete the work of the eighth grade, and nearly one-half of them leave school before they reach the seventh grade. Most of these boys and girls go to work with practically no foundation for mental development, and only a few of them become skilled workmen in any occupation requiring a trained mind.

A majority of these pupils leave school because they find no interest in the subjects presented in the course of study and because their parents are unable to realize the importance to their children's success, of at least, an elementary education, whatever occupation they may follow. If the course of study could be so changed as to relate it more vitally to the occupations of life, it is agreed that

most of these pupils could be retained in school. Under the leadership of the United States Bureau of Education, the leading educators made such revisions of the courses of study as enabled them to provide more liberally for vocational subjects and vocational guidance.

Vocational Guidance. Vocational guidance is the first step in vocational education. For lack of it at the proper time, many boys and girls become misfits for life. By vocational guidance is meant that friendly interest in and oversight of boys and girls that will keep them in school, hold up to them ideals worth following, and lead them to have a definite purpose in life. This oversight should be given by both parents and teachers, and should always be kindly and sympathetic. Its ultimate aim should be to lead boys and girls to choose their life work deliberately, and to make such choice as will harmonize with their respective desires and aptitudes and lead to a successful career. Proper vocational guidance does not force boys and girls to choose occupations before they are old enough to know what they want to do. On the contrary, it strives to prevent them from making choice hastily.

Vocational guidance is especially helpful to boys and girls between twelve and sixteen years of age. It should help them "to a better understanding of their own abilities, of the opportunities afforded to do the world's work and of the best possible use to be made of such abilities and opportunities." Between fourteen and sixteen years of age, both boys and girls leave school in large numbers. A wise vocational counselor may influence many of them to remain in school for one or two years more. But he should follow with equal care those who go into the various lines of industry. These young people should be encouraged to continue their education while at work, and all possible assistance should be given them.

The competent vocational counselor also keeps in touch with the employer. While noting the industry and the efficiency of these young people, he likewise notices the conditions under which they work, and whether or not the occupation in which each is engaged is suited to the worker's strength and aptitude. When one is found working amidst undesirable surroundings or at an occupation for which he is in no wise fitted, a change is recommended. On the other hand, boys and

girls should be encouraged to give the occupations they have respectively entered upon a fair trial, to put their best efforts into their work and to learn all they can about the business or trade in which they are engaged.

Pre-Vocational Education. Pre-vocational training is designed to assist young people who have not chosen a vocation in making such a choice. In large cities where there are schools equipped for carrying on various lines of industry the pupils are given opportunity to try out different vocations. But in addition to this, instruction is given upon the advantages, possibilities and disadvantages of each occupation, so each pupil may have a fair understanding of the relative position in the world's industry which the vocation he chooses holds. The bearing of the different branches in the course of study upon the various occupations should also be explained, and courses of reading should be suggested. The Junior High School is an important aid in this phase of the vocational education (see HIGH SCHOOL, subhead *Junior High School*).

Vocational Schools. About eighty-five per cent of the pupils trained in the public schools earn their living through industrial processes, and vocational schools are designed to fit young people for useful occupations. They differ from the old style manual training school in training their pupils specifically to enter upon some occupation, while the instruction in the manual training school is more for the purpose of training the hand for the cultural value derived from such training.

Vocational schools are elementary in character, but they do not receive pupils under fourteen years of age. The courses are usually two years in length; a few schools have three-year courses. In most of the schools the time is about equally divided between book-work and shop-work. The school work includes English, mechanical drawing, mathematics and other closely-related subjects. The shop-work is taught by practical men. Many evening schools are largely vocational.

Continuation Schools. There is an increasing demand for better educated workmen in all lines of industry. Many boys and girls and men and women have entered upon their chosen vocations with less than a com-

mon school education, and the purpose of continuation schools is to enable these people to continue their school work while following their occupations. Students in these schools may pursue lines of work that will perfect them in some special industry, or they may continue their general education. Evening schools may be considered a branch of continuation schools. The most successful schools of this type are those where arrangements are made with the employer by which the student is allowed to spend a part of the day at work and the remainder at school. In some schools the students are allowed credit for this outside work. Schools operating on this plan are sometimes called *coöperative* schools.

Technical High Schools. Technical high schools have become a feature in the school systems of most large cities. Such schools aim to prepare trained workers for leadership in the industrial world, for positions of higher rank than those of skilled mechanics. Cleveland and Chicago took the lead in introducing industrial courses in high school work, and these and other cities have such special schools.

The textile industry in the United States supports a number of schools which are closely allied to the high schools. Prominent among these are the Textile School of the Pennsylvania Museum at Philadelphia, and three schools in Massachusetts, at Fall River, New Bedford and Lowell, all three cities being great cloth manufacturing centers. These schools, which are partly supported by the state, turn out mature students able to fill important positions in the textile mills. Secondary schools, such as the Lewis Institute at Chicago, the Drexel Institute at Philadelphia, and the Pratt Institute at Brooklyn, now offer similar courses of training.

Trade Schools. Trade schools have been developed to take the place of the apprenticeship system. The first important one in the United States, the New York Trade School, was founded in 1881, and was intended primarily for the mechanics in the building trades. A number of other important schools were established in the next thirty years, but not until 1910 was there a notable increase in the number of trade schools. Many of the schools, like the Baron de Hirsch School in New York, are privately endowed. In Chicago, Milwaukee, Philadelphia, Indianapolis, Worcester and Portland, Oregon,

are trade schools supported wholly or in part by the municipality.

United States Aid. The most important factor in promoting vocational education in the United States is the Smith-Hughes Act, which became effective in February, 1917. This law is explained under HIGH SCHOOL (which see). The passage of this bill, for which the National Society for the Promotion of Industrial Education had labored for ten years, marked the beginning of a new educational policy, in granting Federal aid to schools below collegiate grade which are not state institutions. This act supplements the Morrill Act, which provided for the state agricultural colleges and experiment stations, and it makes provision for the training of a large group of the population that cannot be reached directly by the Federal government. The provision of the act requiring the state governments to coöperate with the Federal government in order to derive any benefit from the appropriation places vocational education on a permanent basis in every state.

Aid to Soldiers. In June, 1918, Congress passed a law providing for the vocational education of disabled soldiers and sailors on their return to civil life. The responsibility for this training is placed with the Federal Board of Vocational Education, and the plan provides for the coöperation of the War and Navy departments, the Bureau of War Risk Insurance and the labor exchanges in the Department of Labor. The scope of the work includes completion of the training for such occupation as the soldier may choose and placing him in industry.

Another important phase of vocational education among the soldiers is the Students' Army Training Corps. The aim of this corps is "to train officer-candidates and technical experts of all kinds to meet the needs of the service." Soon after the organization of this work it was placed in operation in over 550 colleges, universities, professional, technical and trade schools of the country. The corps was divided into two sections—collegiate, or section A, and vocational, or section B. The work in section B dealt largely with the difficulty confronting the government at the beginning of the war, and stated in the opening paragraph of this article. In order to accomplish the work necessary within a given time, the soldiers were assigned to the various schools and colleges of the coun-

try, where they remained under military discipline and were given industrial instruction, including shop practice for periods of two months each, one unit following another until the training was completed.

Effect Upon the Educational System. The work of the section B units of the Students' Army Training Corps is considered to have been the most significant experiment in vocational education undertaken under a democratic form of government, and the influence upon the American educational system has been far-reaching. The results derived from these short courses have demonstrated beyond doubt the futility of short and incomplete courses and shop periods. It is necessary for the student to devote enough time to vocational training to work out the processes completely. This experiment also demonstrated the necessity of a more general development of the continuation school and upon a much larger scale than has yet been contemplated.

Another fact learned from the recent study of vocational education is that laws relating to general education, laws relating to vocational education and laws relating to child labor are not coördinated. Until such coördination is made in both state and national laws, the most efficient work in education cannot be done.

VOD'KA, an alcoholic liquor in concentrated form distilled from rye, potatoes or barley and widely in use by the peasants in Russia previous to its prohibition by edict of the czar, early in the World War. This edict was followed by increased military efficiency and comparative prosperity among the peasants. The sobering up of the millions who had been formerly brutalized by drink was a potent cause in bringing about the revolution of March, 1917. During the revolution, great stores of liquor in the cellars of the nobility were destroyed. See **RUS-SIA**.

VOICE, *vois*, sound emitted by the vocal cords of persons and animals, by means of which they communicate to one another their thoughts or emotions. The organ of the voice is the larynx, a cartilaginous box at the top of the trachea, or windpipe, capable of more delicate adjustment than any musical instrument. Across its top are stretched highly-sensitive and delicate mucous membranes, the edges of which are specialized to form the vocal cords. Sound is produced by

a blast of air forced from the lungs upward through the glottis, or opening between the cords.

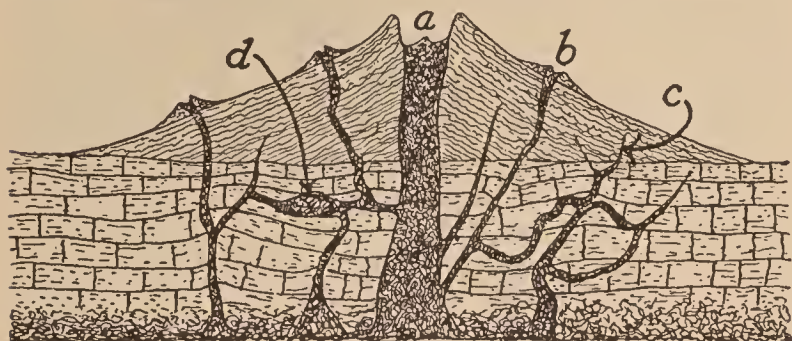
The pitch of the voice depends upon the tension of the vocal cords; the greater the tension, the higher the note produced. During the emission of acute sounds, the glottis contracts to a mere line. A deep rumbling sound is made by relaxed cords. The strength or loudness of the voice depends on the energy of the expiratory blast. Its quality depends upon the form and thickness of the cords, and is modified by the varying position of tongue, teeth and lips.

In the speaking voice, the notes have nearly all the same pitch, variety being mainly achieved through articulation in the mouth. The musical voice makes use of a larger number of notes, and their vibrations correspond to the notes of the musical scale. In singing, the vocal cords are under greater tension than in speaking. The principal difference between male and female voices lies in their pitch. The female vocal cords are shorter than those of the male, therefore their pitch is correspondingly higher. The male singing voice is classed as tenor, or bass, according to quality, and the female as soprano or contralto. The combined range of both covers about four octaves. A boy's voice is alto or soprano, because the vocal cords are no longer than those of the female. Change of voice in the adolescent boy, when the voice cracks or breaks, is due to rapid change in the larynx and temporary imperfect muscular control. See **LARYNX**.

VO' LAPUK, an artificial language invented by Johann Martin Schleyer, a German priest, and published by him in 1879. It was intended for use as an international language, but the hope of its friends has never been realized. Volapük is extremely simple and regular in construction, and the orthography is entirely phonetic, the words being pronounced as they are written. The root words are derived from all the languages of Europe. Volapük at first attracted many students, and international congresses were held in 1884, 1887 and 1889. Disagreements among its adherents regarding reforms in the language retarded the movement and ultimately led to the development of new and rival systems. See **ESPERANTO**.

VOLCANO, *vol ka'no*, a mountain that has one or more openings through which heated matter is thrown from the interior. The

parts of a volcano are shown in the illustration below. The base comprises the walls and often blends with the cone so completely that no line of separation can be discovered. The term *cone* is usually applied to the upper



VOLCANO

(a) Crater; (b) Extinct crater; (c) Crevice; (d) Steam cavity.

and more recently formed portion of the volcano. In its summit is the opening called the *crater*. Leading from the crater down into the interior of the mountain is the *vent*, or *chimney*.

The form of the volcano depends quite largely upon the material thrown out. If this is ashes or thick viscid lava, that does not flow rapidly, the slopes of the mountain are steep and may be quite regular, as in the case of Vesuvius, Etna and many of the volcanoes of the Andes. If the material is of molten lava, that flows freely, a low, flat mountain, with gentle slopes, is formed. The volcanoes of Hawaii are the best illustrations of this type. In these volcanoes the flow of lava seldom takes place through an opening at the summit, but an outlet is forced through one or more crevices in the sides of the mountain. The crater is large and shallow and contains numerous vents, surrounded by small cones. Between these may also be found pools of molten lava.

In size, volcanoes vary from low mountains, comparatively small, like those in the vicinity of the Mediterranean, to great peaks, whose summits are from 17,000 to 20,000 feet above the sea, as is seen in the volcanoes of the Andes and the highest peaks of the Rocky Mountains, which are extinct volcanoes.

Volcanoes are classified as active, dormant and extinct. *Active* volcanoes are those either in continuous or frequent action. *Dormant* volcanoes are those which are active only at long intervals, and *extinct* volcanoes are those which have ceased action altogether. There is, however, no absolute division, as a volcano may pass from one class into another without warning, that is, a dormant or extinct volcano

may become active, and an active volcano may become extinct.

Eruptions. The nature of the eruption is determined by the character of the material thrown out, and its violence is usually proportional to the length of time the mountain has been quiet. Volcanoes accustomed to throw out molten lava seldom eject ashes in large quantities. At the beginning, the lava flows rapidly, but as it cools it crusts over and flows more and more slowly until its motion ceases. The flow destroys everything in the path of the fiery stream, and the eruption often causes great devastation, suffering and loss of life. Some eruptions are characterized only by solid matter and steam. The solid matter is in the form of masses of rock, gravel, sand and dust, or ashes. These rise to a great height and are often carried through the atmosphere for many miles.

The causes of volcanic action are not well understood; but the chief cause is generally believed to be the contact of water with highly heated portions of the earth's interior. The violence of the action is supposed to be due to the expansive force of steam that has suddenly been released from great pressure. The steam forces out the ashes. The flow of lava is probably caused by its being squeezed into the fissure by the movements of the earth's crust. Some geologists believe that there are lakes of molten rock in various places in the interior of the earth, and that these are subject to tides like those on the ocean. They reason that the increased pressure caused by these tides may now and then force an opening in the earth's crust through which the heated matter is thrown out. An eruption is usually preceded by an increase in temperature of the land at the base and on the sides of the mountain, the drying up of springs and wells and frequently by local earthquakes. The most disastrous eruptions, as affecting loss of life, were the eruption of Vesuvius, A. D. 79; Krakatoa, in 1883, and Mont Pelee, on the island of Martinique, in 1902. At this eruption over thirty thousand people lost their lives within a few hours. The eruption of Mount Etna in 1911 was also very disastrous.

Related Articles. Consult the following titles for additional information:

| | | |
|------------|-------------|----------------|
| Aconcagua | Herculaneum | Mauna Loa |
| Ararat | Hood, Mount | Mountain |
| Cotopaxi | Kilimanjaro | Pompeii |
| Earthquake | Lava | Popocatepetl |
| Etna | Martinique | Rainier, Mount |
| Fujiyama | Mauna Kea | Vesuvius |

VOLE, an English name applied to several species of the rat family. The voles are widely distributed, being found in Europe,



FIELD VOLE

Africa, Asia and in North and South America. The *water* vole is about the same size as the brown rat, and it is often called a rat. It has dark brown or black fur, a tail about half the length of the body, and very strong hind feet, with five rounded pads on the lower surfaces. It burrows by the banks of streams and feeds for the most part on vegetable food. The *field* vole, or *short-tailed field mouse*, is about the size of a common mouse, but the body is stouter and the tail shorter. It has brownish-gray fur; its hind feet have six pads. It lives in fields and woods, feeds on vegetable food, is very prolific and often does much damage to grain and other crops. The *bank* vole is like the field vole, but it has a rusty-colored back, larger ears and a longer tail.

VOL'GA, a river of Russia, the largest in Europe. It rises near the Valdai Hills, in the northwestern part of Russia, and flows in a circuitous course eastward and then southward, entering the Caspian Sea through a broad delta, a few miles below Astrakhan. The length of the river is about 2,200 miles, and it is navigable for nearly its entire course. The chief tributaries from the north and east are the Oka, the Sura and the Sarpa, and from the west, the Tvertsa, the Mologa, the Sheksna, the Kostroma, the Vetluga, the Kama and the Samara. The width of the river varies from 420 feet to 700 feet and exceeds even 2,400 feet, at Nijni Novgorod. During the spring it sometimes overflows, when its width varies from one and one-fourth miles to three miles. By means of canals the Volga is connected with the Black, the Baltic and the White seas, and with other important navigable rivers, so that it constitutes one of the most important inland waterways of Europe. With its tributaries it traverses a region inhabited by 50,000,000 people.

VOLT, the unit employed in measuring electric pressure, such a pressure as will produce a flow of one ampere per second against a resistance of one ohm.

VOLTA, *vohl' ta*, ALESSANDRO (1745-1827), an Italian scientist, famous for his researches and discoveries in physics and as the inventor of the voltaic battery, named after him. He was born at Como, Italy, where, in 1774, he became professor of physics in the Royal School. He previously made important investigations and discoveries in chemistry and physics, especially in electricity. In 1779 he became professor of physics in the University of Pavia, and remained there twenty-five years. He invented the electroscope, the electrical condenser, the voltaic pile and the voltaic cell, or battery. See ELECTRIC BATTERY.

VOLTA'IC CELL, or **VOLTAIC BATTERY**. See ELECTRIC BATTERY; ELECTRICITY, subhead *Voltaic Electricity*.

VOLTAIRE, *vol tair'*, the assumed name of JEAN FRANÇOIS MARIE AROUET (1694-1778), a French writer and philosopher, was born at Paris. His father, a notary, gave him the best education possible, and the young man was early recognized as a scholar. In 1718 a tragedy named *Oedipus* was brought out by him and was most enthusiastically received. He soon became a fashionable poet, and resided mainly at Paris, in the midst of the most brilliant society.

In 1726 he was imprisoned in the Bastille for having sent a challenge to the Chevalier Rohan, by whom he had been insulted, but he was liberated within a month and allowed to go to England. Here he resided till 1729, in friendship with some of the chief literary men of the day, and he acquired a knowledge of English literature. His *Henriade*, an epic celebrating the exploits of Henry IV of France, was completed and published by subscription in England, and was widely read throughout Europe, except in France, from which country it was excluded by the government because of its forceful presentation of the idea of religious toleration.

After his return to France, Voltaire lived chiefly at Paris till 1734. During this period he raised himself from very moderate circumstances to a condition of affluence by successful monetary speculations. From 1734 to 1749 he resided with Madame du Châtelet at Cirey, in Lorraine, and he produced many plays during this period. After

the death of Madame du Châtelet, Voltaire accepted the oft-repeated invitations of Frederick the Great to live at his court, at Potsdam. Here he was received with great honor, but a series of disagreements with the king ended in Voltaire's retirement from the Prussian court in 1753. After some unsettled years he fixed his residence with his niece, Madame Denis, at Ferney, near the boundary of the Republic of Geneva, and here he received a constant succession of distinguished visitors and maintained a correspondence which included in its range most of the rulers and savants of Europe. In February, 1778, he returned to Paris, but died soon afterwards.

Voltaire's works embrace almost every branch of literature—poetry, the drama, romance, history, philosophy and even science. He produced no single literary masterpiece; his greatness lay in his power to discern fanaticism and superstition, and nearly all his works are strongly animated by a spirit of hostility to the priests and the religion they represented. He was one of the foremost of that band of writers whose revolt against conventions, openly and most forcefully expressed, was preparing the way for the French Revolution. It is the commonly accepted opinion that he was an atheist, but this has never been proved. Voltaire's literary fame chiefly rests on his philosophical novels, *Zadig*, *Candide*, *L'Ingénu*; his histories, *The Age of Louis XIV*, *The History of Charles XII*; his correspondence, and more than all, perhaps, on his poetical epistles, satires and occasional light poems, all of which exhibit wit, gaiety, vivacity and grace.

VOLTMETER, an instrument for measuring the pressure of an electric current. It consists of a permanent steel horseshoe magnet, with a piece of soft iron attached to each pole. Between the poles, a soft iron cylinder is suspended, so that it can rotate vertically. Around this cylinder is a light rectangular frame of copper, wound with a coil of insulated wire. Spiral springs are attached at each end of this frame, and a needle, which moves over a graduated dial, is attached to the upper end of the axis. When an electric current passes through the coil or wire, it causes the copper frame to turn upon its axis. The springs furnish an amount of resistance that must be overcome by the current, and the position of the needle on the dial indicates the pressure. Volt-

meters are used with dynamo electric machines. See VOLT.

VOLUNTEERS', citizens who, of their own accord, offer the state their services in a military capacity. The oldest volunteer force in Great Britain is the Honorable Artillery Company of the city of London, which received its charter of incorporation from Henry VIII. Until the second year of the World War Great Britain depended upon a volunteer army to take care of territorial defense, and its volunteer forces in 1914 numbered over 251,000. Not until May, 1916, was conscription put in force in Great Britain. It was applied to England, Scotland and Wales, but not to Ireland, which, however, sent large numbers of volunteers to the front. Canada contributed a volunteer army of over 400,000, but adopted conscription in December, 1917. New Zealand, South Africa and Australia relied wholly on volunteering, and all contributed generously. In all of the other allied nations, as well as in the enemy countries, conscription had been a permanent policy before the war.

In the United States. The volunteers in American armies played an important part in all wars before America's entrance into the World War. Though conscription was resorted to in the Civil War, about 2,500,000 enrolled voluntarily on the Union side, and half as many on the Confederate. Volunteers and regulars made up the American army of the Spanish-American War. In the World War there were calls for volunteers in special branches of the service, and the state national guards were classed as volunteers, but the bulk of the great army that contributed so much to the defeat of Germany was made up of men enrolled through the selective draft. This was the first time that America ever enrolled all of its men under forty-six years of age for military service. Navies are usually recruited through volunteering, but this is a matter of custom and precedent. See CONSCRIPTION; WORLD WAR.

VOLUNTEERS OF AMERICA, a religious and philanthropic organization, formerly the American branch of the Salvation Army. In 1896 Ballington Booth, head of the Salvation Army in America, believing that the methods of his father, William Booth, were not perfectly suited to conditions in America, severed the connection of his branch which, thenceforth, has had an independent

existence. The main purpose of the English and the American bodies, however, has remained the same.

The Volunteers are organized on a semi-military plan, and the officers bear military titles. They support various benevolent institutions. Lodging houses for destitute men and women and fresh-air camps for women and children are among their most important charities. A great quantity of Christian literature is distributed, and open-air religious services are conducted on the streets. A Volunteer Hospital has been established in New York City, where needy cases are taken care of. The official organ of the society is *The Volunteers' Gazette*, published at its headquarters in New York. General Ballington Booth and his wife, Maud Ballington Booth, are joint presidents. See SALVATION ARMY.

VOMITING, the forcible expulsion of matter from the stomach, through the oesophagus, or gullet. It is not a disease in itself, but it is a symptom common to numerous diseases, or as an accompaniment of extreme nervous sensitiveness. The treatment of vomiting depends upon its cause and upon the disease, if any, which accompanies it. Lying down, the application of mustard to the pit of the stomach, or small doses of soda, ice, whisky or coffee will sometimes relieve it. While sudden and violent vomiting in a healthy person is an indication of some poisonous substance in the stomach, yet very frequently vomiting is nature's method of relieving an overloaded stomach. See NAUSEA.

VORTICELLA, *vor te sel'lah*, or **BELL ANIMALCULE**, *an i mal'ku le*, a genus of infusoria, or one-celled animals characterized by a bell-shaped body, the opening of which is surrounded by tiny hairs, or cilia. These cilia are kept in constant and rapid motion, whereby they draw in particles of food. At the opposite end of the body is a slender stem, by means of which the animal attaches itself to objects in the water, such as rocks or weeds. This stem also moves, with a spiral springlike motion, and may be drawn up into the body when the animal wishes to detach itself from its moorings and swim freely about.

VOSGES, *vohzh*, **MOUNTAINS**, a chain of mountains about 100 miles long, extending in a north-northeast direction along the frontiers of Alsace in France, their course being nearly parallel with that of the Rhine. They

are separated from the Jura Mountains by the valley of the Doubs on the south. The Vosges are composed chiefly of granite and are covered with forests of pine and beech to a height of about 3,600 feet, beyond which their summits, which are rounded in forms, are grassy. The highest peak is Ballon de Guebwiller, 4,067 feet. These mountains contain considerable silver, copper, lead and coal and large quantities of rock salt. Some of the bitter fighting of the World War took place in the Vosges region.

VOTE. See ELECTION; BALLOT.

VOTING MACHINE, a device for automatically registering and counting votes, having the advantages of secrecy, simplicity, rapidity of registration and counting and the avoidance of duplication.

In most patterns of voting machines, the voter enters the booth, and not till all the curtains are closed will the machine register his vote. The names of the candidates are arranged in order, either by parties or alphabetically. The voter can either vote a straight ticket or can vote for individual candidates. In the former case, either by the use of a key or by means of a lever, he registers a vote and thus locks the mechanism, so that he cannot vote further, unless, by turning back the lever, he cancels his first vote. If he wishes to split the ticket, he turns a lever or key for one candidate for each office, and is prevented thereby from voting for any other candidate. As he leaves the booth, by opening the curtains or doors at the exit he sets the machine for the next voter. Each vote cast for each office or for a straight ticket is registered by a patent device on a slip of paper, so that as soon as the last vote is cast, the final returns are ready to be announced. Many states have authorized the use of voting machines at the option of the local authorities.

VOWEL, an open sound made by the voice in speaking, distinguished from the consonant sounds, which are made with the organs of speech more or less closed. Vowels may be sounded by themselves, but consonants can be pronounced only in combination with vowels. In English, the vowel sounds are represented by the letters, *a, e, i, o, u*, and sometimes *w* and *y*. Each really represents several sounds, as the *a*-sounds in the words *father, flask, hall, what, any, preface, final* and *abound*. Most other languages have vowel sounds which the English does

not possess. A more detailed discussion of vowels may be found in the article ORTHOGRAPHY.

VUL'CAN, called by the Greeks Hephaestus, in classical mythology, the god who presided over fire and the working of metals, and who patronized handicraftsmen of every kind. He was the son of Jupiter and Juno, but, unlike the other gods, he was seriously lame. By some writers he was said to have been born lame, and for that reason he was believed to have been thrown by his mother from Olympus; but by others his lameness is attributed to his having been thrown from Olympus by Jupiter, for interfering in Juno's behalf in a quarrel between her and Jupiter.

VUL'CANIZING. See RUBBER AND RUBBER MANUFACTURE.

VUL'GATE, the Latin translation of the Bible, which has, in the Roman Catholic Church, official authority, and which the Council of Trent, in its fourth session, on May 27, 1546, declared "shall be held as authentic in all public lectures, disputations, sermons and expositions; and that no one shall presume to reject it under any pretense whatsoever." Even in the early period of the Church, a Latin translation of the Old Testament existed, made not from the Hebrew, but from the Septuagint. Saint Jerome found that this translation was not always accurate, and between A. D. 385 and 405 he made a new Latin translation from the Hebrew, with the aid of the best Greek translations. This at first met with the greatest opposition, as the Septuagint was regarded as an inspired translation, and any deviation from it was considered sacrilegious. Before his death Jerome had justified himself and proved the purity of his intentions, but it was not until the ninth century that his version came to be used throughout the Church and not until centuries later that it was authorized. The version now in use is the edition published by Clement VIII in 1592.

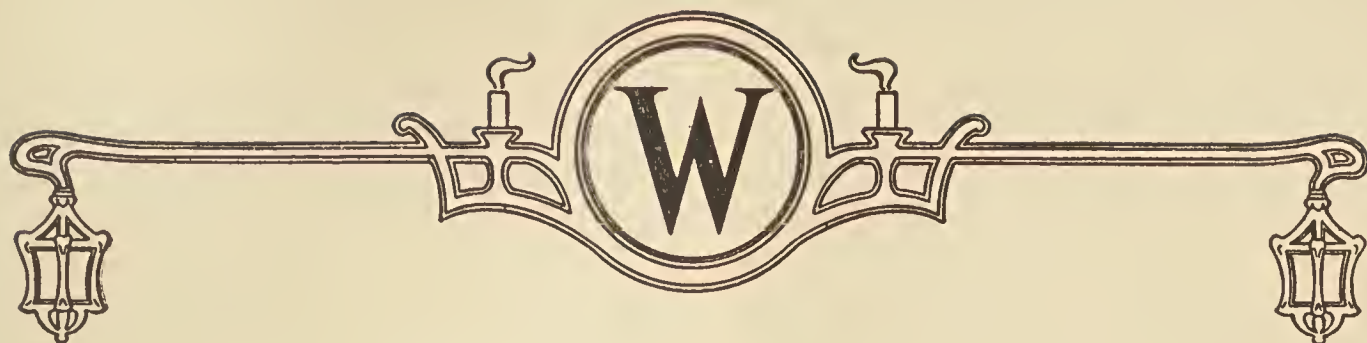
VUL'TURE, the common name for a class of carrion-eating birds, characterized by necks destitute of feathers and by elongated beaks, with curved upper mandibles. Their talons are not relatively strong, and in tear-



VULTURES

1, Griffin; 2, Pondicherry.

ing their prey they make more use of their beaks than of their claws. Vultures are usually of a cowardly disposition and will not attack live animals, unless the latter are seriously wounded or dying, as they feed almost entirely on decaying animal flesh. They fly high in the air and detect their prey from great distances. They are valuable scavengers in all warm and tropical countries. The California vulture has a long, flat, orange-colored head and dull black plumage, with a grayish wing band. It builds a loose nest of sticks, in a hollow in a tree or cliff, and lays one round, greenish-white egg. The Egyptian species, called "Pharaoh's hen," is found in the countries bordering the Mediterranean. See CONDOR; TURKEY BUZZARD.



W, the twenty-third letter of the English alphabet. It is formed, as its name indicates, by doubling the *u* or *v*, and before it appeared as a separate character in English its sound was sometimes represented by *uu* or *vv*. At the end of words or syllables it is either silent, as in *low*, or it modifies the preceding vowel, as in *new*, *how*, having then the power of a vowel.

WABASH, *waw'bash*, IND., the county seat of Wabash County, forty-two miles southwest of Fort Wayne, on the Wabash River and on the Big Four and the Wabash railroads. It is surrounded by a rich agricultural and stock-raising region. Its industries include railroad shops, bridge and iron works, cabinet and motor truck factories and woolen and lumber mills. The city is built in rock and is hilly even in the business section. It has a Federal building, Carnegie Library, Masonic Temple and Memorial Hall. Wabash was settled and incorporated in 1837, and was chartered as a city in 1866. Population, 1910, 8,687; in 1920, 9,872, a gain of 14 per cent.

WABASH RIVER, a river 550 miles in length, rising in the western part of Ohio, flowing northwestward, westward then southward into the Ohio thirty miles below Evansville, Ind. It crosses Indiana, and in the latter part of its course forms a part of the boundary between Indiana and Illinois. It is navigable during high water as far as Lafayette, Ind., and at ordinary levels to Covington. Its chief tributary is the White River. Some of the principal towns on its banks are Wabash, Peru, Logansport, Lafayette, Covington, Terre Haute and Vincennes.

WACHT AM RHEIN, DIE ("the Watch on the Rhine"), a German patriotic song. The words were written by Max Schneckenburger in 1840, when the left bank of the Rhine seemed in danger of falling into the hands of

France. The music, by Karl Wilhelm, was composed in 1854.

WA'CO, TEX., the county seat of McLennan County, located ninety-seven miles southwest of Dallas, on the Brazos River and on the Texas Central, the Missouri, Kansas & Texas, the Saint Louis Southwestern, the Gulf, Colorado & Santa Fé, the San Antonio & Aransas Pass and the International & Great Northern railroads. Water with medicinal properties obtained from artesian wells makes the city a popular health resort. It is surrounded by an agricultural and stock raising district, and is the center of a large wholesale business. There are grain elevators, flour mills, cotton and woolen mills, foundries, machine shops, bottling works and packing houses. Notable buildings are the Waco Natatorium, a Federal building, a Carnegie Library, courthouse and Masonic Temple. Baylor University and Paul Quinn College are located here.

Waco was laid out in 1849 and was incorporated the next year. It has adopted the commission form of government. Population, 1910, 26,425; in 1920, 38,500, a gain of 46 per cent.

WADAI, *wah'di*, formerly a native state in the central part of Africa, annexed to the French Congo in 1909. The boundaries are indefinite, but the area is estimated at 170,000 square miles. The surface is mostly of a desert character, but there are oases scattered through the region, and in some sections there are fertile tracts covered with forests. The population, estimated at 2,000,000, is composed chiefly of negroes and Arabs, who are Mohammedans. The capital is Abeshr, and it is connected with Bengeazi by caravan route.

WAGER, *wa'jur*, a bet, also something staked on any uncertain outcome of an issue, such as the result of a contest, or the in-

evitable alternative in events, such as elections and the weather. The party whose opinion proves to be correct receives what has been staked by both. By statutes of England, Scotland and the United States, all contracts or agreements, whether oral or in writing, depending on wagers, are null and void, and money due thereon cannot be recovered in any court of law. A wager is therefore called a *debt of honor*, since it cannot be collected except through the good faith of the parties.

WAGES, *wa'jez*. In modern industry production requires land, capital and labor. The payment for land is *rent*; the payment for capital is *interest*, and the payment for labor is *wages*. In the common meaning of the term *wages* is the money one man receives for working for another. Wages may be classified as *nominal* and *real*. Nominal wages are the wages expressed in money, or as an absolute quantity, as five dollars a day. Real wages denote the purchasing value of the money received. To illustrate: If the cost of living advances and a laborer's wage remains the same, his real wage is lowered. If a bricklayer who received five dollars a day in 1914, received the same wage in 1919, when the cost of living had increased fifty per cent, his real wage was only one-half of what it was in 1914. To enable him to maintain his standard of living his nominal wage in 1919 would have to be raised to seven and one-half dollars a day.

Difference in Wages. In economics, labor is considered as a commodity, the same as land, building material or wheat, and one of the chief causes in fixing wages is the law of supply and demand, other conditions being equal. When there are more laborers than production requires, wages will be low; when laborers are scarce, producers bid for their services, and wages are high. Wages in some occupations are higher than in others because of the nature of the occupation. Permanency of occupation, for instance, is an important factor in fixing wages. One can afford to work for a lower wage at an occupation which furnishes employment the year round than at an occupation which furnishes employment only part of the time. Skilled labor commands higher wages than unskilled labor, and dangerous occupations higher than those not considered as dangerous.

Wages and Profit Sharing. Many large firms distribute periodically among their employes a certain per cent of their profits.

From the viewpoint of economics, their share of profit should not be considered as wages, but from the practical viewpoint of both employer and employe it is considered as so much additional compensation, or so much increase of the laborer's share of production.

Influence of Labor Organizations. Labor organizations have in many instances secured higher wages for their members than could have been secured without organization, because the organization can resort to collective bargaining and force upon employers terms that the workmen individually cannot secure. On the other hand, the uniformity of wages thus secured may work injustice to the most efficient laborers, who under individual initiative could increase their output and are thus deprived of their full share of production.

The Wage Problem. The problem of wages is always before the industrial world, and it is the supreme cause of conflict between capital and labor. There are those who believe that capital and labor are and ever must be antagonistic, and that the capitalist class should be dispossessed of their property. The socialists claim that all sources of production should be the property of the state and that the laborer should receive all the profits for his work. Present tendencies are toward more harmonious relations between capital and labor, and toward just compensation of laborers.

Related Articles. Consult the following titles for additional information:

| | |
|---------------------|----------------|
| Capital | Profit Sharing |
| Labor Organizations | Socialism |

WAGNER, *vahg' nur*, WILHELM RICHARD (1813-1883), a German composer, poet and miscellaneous writer, born at Leipzig. He received his education at Leipzig and Dresden and after 1834 filled various musical engagements at Magdeburg, Riga and Königsberg. In 1839 he went to Paris and London and there composed his operas *Rienzi* and *The Flying Dutchman*. The brilliant success of the operas secured him the conductorship at the Royal Opera of Dresden in 1843. He joined the



WILHELM RICHARD
WAGNER

insurrectionary movement of 1848 and was compelled to exile himself. Until his return to Germany, in 1864, he spent most of his time in Switzerland, Italy, Paris and London. His *Tannhäuser* and *Lohengrin* appeared in 1845 and 1850, respectively. The king of Bavaria, Louis II, became an enthusiastic patron of Wagner, and the theater at Baireuth, especially built for Wagner by the contributions of Wagner societies throughout the world, was chiefly supported from the king's purse. Here the famous tetralogy *Der Ring des Nibelungen*, consisting of *Das Rheingold*, *Die Walküre*, *Siegfried* and *Götterdämmerung*, was first performed in 1876. About a year before his death Wagner wrote *Parsifal*, which has since been produced with emphatic success. He gave to his works a national character by selecting his subjects from old German legends. His theory, founded upon the ideas of Gluck and Weber, was that in a perfect musical drama, the three arts, poetry, music and dramatic representation, should be welded together into one well-balanced whole. His particular views on music are embodied in a well-known work, entitled *Oper und Drama*. See OPERA.

WAG'ON, a four-wheeled vehicle drawn by one or more horses and used for carrying passengers or merchandise. In cities they are rapidly being displaced by automobile trucks. Wagons are constructed of a great variety of patterns, the body being adapted to the particular use for which the vehicle is intended. Farm wagons have long rectangular boxes, so made that they can be taken off or put on the gear at will. Most of these wagons may also have the running-gear extended or shortened to suit the purpose for which the wagon is needed. Road wagons have a light running-gear, springs and upholstered seats. The greatest wagon works in America are those of a famous company at South Bend, Ind. See CARRIAGE.

WAGRAM, *wah'gram*, **BATTLE OF**, a battle that resulted in one of Napoleon's most celebrated victories. It was fought at the village of Wagram, twelve miles northeast of Vienna, Austria, on July 5 and 6, 1809, between a force of 128,600 Austrians under Archduke Charles, and 181,700 French under Napoleon. The losses on each side were about 25,000, killed and wounded. On the 12th of the month following the battle an armistice was signed at Znaim, and peace

was concluded on October 14, at Schönbrunn. By the treaty Austria lost some territory to Bavaria and Saxony, and gave up its sea coast to France; a part of Poland and Galicia was ceded to Russia, and Joseph Bonaparte was acknowledged king of Spain.

WAG'TAIL, a group of birds so called from their habit of jerking their long tails when running or perching. Though several species are common in Europe, rarely is the bird seen in the United States. The wagtails frequent muddy lands and pastures, running rapidly along the edge of water and catching the insects they find there. A species of wagtail breeds on the coasts of Alaska in summer, making its nest of woven roots and grasses on or near the ground. The eggs are white with brown spots.

WAITE, MORRISON REMICK (1816-1888), an eminent American jurist, born at Lyme, Conn. He graduated at Yale in 1837 and was admitted to the bar two years later. He practiced successfully in Maumee City and Toledo, Ohio, was elected to the legislature and in 1871 was sent to Geneva as United States counsel in the Alabama case. President Grant appointed him to succeed Salmon P. Chase as Chief Justice of the Supreme Court of the United States in 1874. He held the position until his death, winning esteem for his impartiality and learning. Among the important questions presented to the Supreme Court and decided during Chief Justice Waite's term were those affecting polygamy, election laws, the civil rights of negroes, the Bell telephone case, the power of removal by the President and the Chicago anarchist cases.

WAKE, in the Church of England a festival formerly held on the anniversary of the day on which the parish church was consecrated and dedicated. The evening preceding the anniversary was spent in prayer and singing; the festival itself sometimes lasted several days and took the form of a carnival. The vigil kept by Roman Catholics over the dead before burial is known as a wake.

WAKE-ROBIN. See TRILLIUM.

WALDENSES, *wal den'seez*, a Christian sect founded in the twelfth century by Peter Waldo, a rich merchant of Lyons, France. About 1170 Waldo gave away his goods and his money to the poor and began preaching a life of poverty, chastity and obedience. While holding to the Roman Catholic faith,

he believed the people should be preached to in their own dialects, that religious writings should be translated into their language, and that each man should be his own interpreter of the Bible. His followers, known as "the Poor Men of Lyons," suffered many persecutions, and in 1231 were excommunicated by the Pope. Their chief strongholds then as now, were the Cottian Alps, southwest of Turin. Since 1848 they have had the same religious and political rights as other religious sects in Italy, where they number about 12,000. Branches of the Church have been established in Argentina, Uruguay and the United States.



A typical costume

WALES, *waylz*, the smallest division of Great Britain, situated in the southwestern part of the island, forming a peninsula between Bristol Channel, on the south, and the Irish Sea, on the north. It has an area of 7,446 square miles, or a little less than that of the state of New Jersey. Its surface is mountainous, particularly in the north, where the ranges are an extension of those of England. The country is rich in minerals, particularly coal, iron, copper and slate, and to these Wales owes its chief wealth. The coal trade is the most important and extensive, and the city of Cardiff on the Bristol Channel is one of the largest coal ports in the world. The presence of coal and iron ore has given rise to extensive iron and steel works, and there are also important copper plants. Other manufactures include woolen goods, especially flannel, coarse cloth and hosiery.

Previous to the Roman occupation, Wales appears to have been inhabited by a mixture of primitive Iberians and invading Celts. During the latter part of the Roman occupation one of the four provinces into which the entire island was divided included Wales and was called *Britannia Secunda*. After the invasion of the Saxons the country acquired a distinctly national character, becoming the refuge of the Celts, or early Britons, who were gradually driven to the west. The country was conquered in the thirteenth

century by Edward I, who made his eldest son Prince of Wales, a title that has ever since been conferred upon the heir to the British crown. Succeeding this date there occurred a number of national uprisings, and the struggle for independence in Wales was not entirely suppressed till 1536, when the country became incorporated with England, and its inhabitants received all the privileges of English subjects. The language is Welsh, which is a branch of the Celtic, different from that used by the Irish and the Scotch Highlanders. The political and educational systems of Wales are identical with those of England. See ENGLAND; GREAT BRITAIN; CELTS.

WALES, PRINCE OF, a British title borne by the heir apparent to the British throne. It was first conferred by Edward I on his son, at the time of his conquest of the principality of Wales. Edward III was never Prince of Wales, but the title has been conferred on all the male heirs apparent to the English throne from the time of Edward the Black Prince, son of Edward III. The title is not hereditary, but is purely honorary; it does not pass to the holder automatically, but must be conferred with appropriate ceremony. It implies no power or authority, and the accompanying income is voted by Parliament.

As heir to the crown of Scotland, the Prince of Wales bears the titles of *Prince and High Steward of Scotland, Duke of Rothesay, Earl of Carrick, Baron of Renfrew, and Lord of the Isles*. The title Earl of Dublin also was borne by Albert Edward when he was Prince of Wales.

The title was bestowed on the present Prince of Wales in June, 1910, less than three months after his father ascended the throne of Great Britain.

WALHALLA, *wahl hahl'a*, or **TEMPLE OF FAME**, a magnificent marble palace erected in 1830, near Ratisbon, Bavaria, by Ludwig I. The building, 115 by 246 feet in size, is in a style similar to Greek Doric. The pediments and frieze contain sculptures representing scenes from the early history of the Teutonic peoples, and inside are busts of noted Germans. The building is named for Walhalla, the mythological hall of the Norse deities.

WALKER, FRANCIS AMASA (1840-1897), an American economist and statistician, born at Boston, Mass., the son of Amasa Walker. He graduated at Amherst College and after-

ward studied law. He served in the Union army in the Civil War and was made brigadier general for gallantry at Chancellorsville, where he was wounded. From 1865 to 1867 he taught Latin and Greek at Williston Seminary, and in 1869 he was appointed chief of the bureau of statistics at Washington. As supervisor of the census of 1870, as United States Indian Commissioner in 1872 and (from 1873 to 1881) as professor of political economy in the Sheffield Scientific School of Yale College, he rendered distinguished service. In 1881 he became president of the Massachusetts Institute of Technology. He published many works, including volumes on the *Indian Question*, *Political Economy*, *The Wages Question*, *Money*, *International Bimetallism* and *The Making of the Nation*.

WALKER, WILLIAM (1824–1860), an American adventurer, notorious as a leader of several filibustering expeditions. He was born at Nashville, Tenn., and was graduated at the University of Nashville. After a course in law he was admitted to the bar, and later he studied medicine at the universities of Edinburgh and Heidelberg. On his return to America he engaged in journalism.

In the summer of 1853 Walker organized an expedition to conquer the state of Sonora, Mex. Forced to flee from Mexico on account of a lack of provisions and ammunition, he was arrested by United States authorities at San Diego, and was tried for violating neutrality, but was acquitted. He then conducted expeditions in Nicaragua and Costa Rica, and each time was driven out. After several attempts to conquer Honduras, he was compelled to surrender to the Honduran government, was condemned by court martial and executed. See **FILIBUSTER**.

WALKERVILLE, ONT., on the Canadian National, the Wabash, the Michigan Central and the Pere Marquette railways, one and one-half mile from Windsor, and directly across the river from Detroit. Steamship lines run to Fort William, Port Arthur, Montreal and intermediate points. The industries of the town are supplied by Niagara electric power; there are varnish and paint factories, wire fence works, bridge works, tobacco, clothing and carriage factories, and manufactories of automobile bodies and trimmings, furnaces, castings and marine engines. Population, 1921, 7,059.

WALKING STICK, a name applied to a group of curiously-shaped insects, which closely resemble a small branch with twigs. In the southeastern part of the United States is found a typical species. The individuals have long, slender bodies and long, thin legs. They are green in summer, but turn brown in autumn; thus protected from detection they escape all but the closest scrutiny. The local names are *devil's horse* and *mule killer*. See **LEAF INSECTS**; **PROTECTIVE COLORATION**.

WALLACE, ALFRED RUSSEL (1822–1913), an English naturalist, born at Usk, Monmouthshire, and educated at Hertford Grammar School. He spent many years in traveling, especially in South America and the Asiatic islands, and the valuable material collected in these scientific explorations he embodied in *Travels on the Amazon and Rio Negro*, *The Malay Archipelago*,



ALFRED RUSSEL
WALLACE

Tropical Nature and *The Geographical Distribution of Animals*. His observation of animal life and his philosophical nature led him to investigations which resulted in the formulation of a theory of natural selection and evolutionary development. Before Darwin gave his famous work to the world Wallace had published his *Speculation on the Origin of Species*. His share in establishing the theory of evolution has been acknowledged by Darwin. But while Darwin, in his later editions of the *Origin of Species*, somewhat modified his original conclusions, Wallace, in a late work, *Darwinism, an Exposition of the Theory of Natural Selection, with Some of its Applications*, strongly insists upon the complete controlling power of these primary laws and conditions. Moreover, he differs from Darwin on the subject of the intellectual, moral and spiritual nature of man. He contends that the higher faculties have been developed, not under the law of natural selection, but under a higher law, which has come in imperceptibly; and he maintains that the Darwinian theory, instead of opposing, "lends a decided support to a belief in the spiritual nature of man." He claimed to be a true Darwinian.

In later years Wallace became interested in social questions, wrote on the subject of land tenure and against compulsory vaccination. He became a convert to spiritualism, and wrote *Miracles and Modern Spiritualism*. He published his autobiography, entitled *My Life*. His other books are *Social Environment and Moral Progress*, *The Revolt of Democracy* and *Man's Place in the Universe*. See EVOLUTION.

WALLACE, LEWIS (1827-1905), an American soldier and novelist, generally known as Lew Wallace. He was born in Brooksville, Ind., received a common school education and began the study of law, which he practiced at intervals in Crawfordsville, Ind. He took part in the Mexican War, with rank of lieutenant, and was a member of the Indiana state legislature in 1848. At the outbreak of the Civil War he entered the service as colonel of an Indiana regiment, was appointed brigadier-general in 1861 and was made major-general for distinguished services at Fort Donelson in 1862. He was removed from command by Halleck, but was reinstated by Grant. He was sent to Mexico on secret diplomatic service in 1866, was elected governor of New Mexico in 1878 and was made minister to Turkey in 1881. His best-known works are *Ben Hur*, *The Fair God*, *The Prince of India* and *The Boyhood of Christ*.

WALLACE, WILLIAM, Sir (about 1272-1305), the first of the great Scottish patriots, a man of herculean proportions and strength and possessing in a high degree those qualities of leadership which made his name famous. The king of England deposed the Scottish king in 1296 and placed over Scotland a guard of English soldiers. Wallace one day quarreled with and killed one of these soldiers, and escaped. He gathered a band of Highlanders and began a guerilla warfare on the English.

After collecting a considerable force, he was besieging the castle of Dundee when he heard that Surrey and Cressingham were advancing upon Stirling with a large army. He met them in the vicinity of that town and gained a complete victory (1297). After this Wallace gained the title of guardian of the kingdom and conducted a series of organized raids into England. In 1298 Edward I entered Scotland, and Wallace retired before him, wasting the country, but he was at length overtaken at Falkirk and

was compelled to fight; after a gallant resistance, he was defeated. He succeeded in escaping, and little is known of his movements thenceforth. He was excluded from the peace granted by Edward to the Scots in 1304, and when he fell into the hands of the English he was conveyed to London and executed as a traitor, though he had never sworn fealty to England.

WALLA WALLA, *wol'a wol'a*, WASH., commercial center of the southeastern part of the state, county seat of Walla Walla County, situated 200 miles southwest of Spokane on the Walla Walla River, on the Oregon-Washington Railroad and Navigation Company and the Northern Pacific railroads. It is thirty miles east of the navigable Columbia River, and a hard-surfaced road has been constructed from Walla Walla to Wallula, the nearest port, to connect with boat lines. Walla Walla is beautifully located in the midst of a fertile valley which produces 5,000,000 bushels of wheat annually, besides extensive fruit, vegetables, live stock and dairy and poultry products. Its industries include cold storage and the manufacture of harvesting and threshing machinery, flour, leather, ice, sashes, doors and blinds.

Whitman College, located here, has been established sixty years and is one of the best known institutions of higher education in the Northwest. Other schools are the Saint Paul's School for girls, the Saint Vincent's Academy and the Walla Walla College. There are a Federal building, a courthouse, a Carnegie Library, a hospital and a home for widows and orphans.

Walla Walla, a term which means *rushing water*, grew up about a military post, established in 1856, and was at first known as Steptoe City. In 1868 it was chartered under the present name. The commission form of government was adopted in 1911. Population, 1910, 19,364; in 1920, 15,503, a loss of 20 per cent.

WALLENSTEIN, *vahl'en stine*, or **WALDSTEIN**, ALBRECHT EUSEBIUS WENZEL VON, Duke of Friedland, Sagan and Mecklenburg (1583-1634), a famous leader in the Thirty Years' War, born at Hermanic, in Bohemia, of poor but noble parentage. He was educated in a Jesuit College and at the universities of Padua, Altdorf and Bologna. Through a wealthy marriage he became prominent in affairs in Bohemia. For

military service against Venice in 1617 he was made a count and commissioned a colonel. He took service in the Austrian army in the struggle against the Turks, and when the Thirty Years' War broke out in Bohemia (1618), he joined the imperial forces against his native country.

With a large army, which he raised to assist the emperor against the Protestant League, he defeated Count Mansfeld at Dessau (1626) and compelled Bethlen Gabor, of Transylvania, to conclude a truce. He also conquered Silesia and bought from the emperor, partly with military services, partly with plunder, the duchy of Sagan, and other extensive estates.

In September, 1630, owing to the jealousy of the nobles and the license of his followers, he was deprived of his command and retired to his duchy of Friedland, until the emperor was compelled to seek his aid against Gustavus Adolphus. Wallenstein then obtained almost absolute power, and his behavior thenceforth leaves no doubt that the emperor's interests were second to his own, and that he would not have hesitated to join the emperor's enemies, to secure his own independence and the crown of Bohemia. After some partial successes he encountered the king of Sweden at Lützen in 1632, and in the battle which took place Wallenstein was defeated and Gustavus was killed. Wallenstein had unsuccessfully treated on his own account with the Swedish king, and he now secretly reopened negotiations with France and the German princes, occasionally taking the field to display his military power. The court at Vienna was well aware of his double dealing, but the emperor was not strong enough to remove him, and he therefore had him assassinated. See THIRTY YEARS' WAR.

WALLFLOWER, a shrubby herb, belonging to the mustard family, native to Southern Europe, so called because it is often found growing among the stones of fallen walls. It thrives in dry soil and gravel and grows well on stony cliffs. The flowers in the wild state are invariably yellow; under cultivation they exhibit a variety of colors. A red specimen is known as bleeding heart. *Heartsease* and *gillyflower* are other names by which the plants are known. The fragrant, velvety flowers are much admired, and have gained for the plant a place in Northern hothouses.

WALL OF CHINA, THE GREAT. See GREAT WALL OF CHINA.

WALLOONS, *wal loonz'*, a Celtic race inhabiting Southern Belgium. They are the descendants of the ancient Belgae and resemble the French more than they do the Germans, being short and mostly of dark complexion. Their language, also called Walloon, is a French dialect, retaining numerous Gallic words, but it varies somewhat in the different provinces. There are about 2,750,000 Walloons now in Belgium.

WALL PAPER, paper used for decorating the walls and ceilings of rooms. The use of paper hangings originated among the Chinese and was not introduced into Europe until the eighteenth century. The papers at first were imitations of the leather, tapestry and velvet hangings which had long been common as wall decorations there, but gradually the designs became original and varied and a large industry grew up. In America the wall paper industry represents approximately \$25,000,000 investment of capital. The design in the sheet, which is printed on presses resembling printing presses, is repeated at intervals; and when the paperhanger puts it on the wall he is careful to match the pattern. Some of the best artistic talent is engaged in the production of wall paper designs.

WALL STREET, the center of financial operations in the United States, so called from the street in lower New York City, upon which are located the New York Stock Exchange, the Consolidated Exchange and numerous banking institutions that figure largely in the money market. The street itself extends from Broadway to East River, following the line of the old city wall built by Governor Peter Stuyvesant in 1653 to protect the town from possible attacks by the Indians. This wall, repaired and replaced from time to time, formed the northern boundary of the city for more than fifty years.

WALNUT, *wawl'nut*, a genus including about twelve species of beautiful trees, mostly natives of North America and Asia. The three best-known species in America are the *English*, or *Persian* walnut, the *black* walnut and the *white* walnut, or *butternut*.

The English, or Persian, walnut is a native of Persia and the Himalaya region, and is extensively cultivated on the California coast and in Southern Europe. It is a handsome

tree, attaining a height of from sixty to ninety feet. It yields a sweet sap, somewhat like that of the sugar maple. The nut, which grows in a thin, wrinkled, two-valved shell, has a high food value, being a greater heat producer than almost any kind of meat. The unripe nuts are much used for making pickles and ketchups. The wood called Circassian walnut, is valuable for cabinet work. The black walnut sometimes attains a height of 150 feet and a diameter of six feet, and is chiefly valued for its timber, which is hard, durable, fine-grained and a beautiful rich brown in color. It has been much used for interior finishing and for furniture, but is becoming rare. A beautiful brown dye obtained from the bark and the husks of the nuts has been much employed in staining lighter woods.

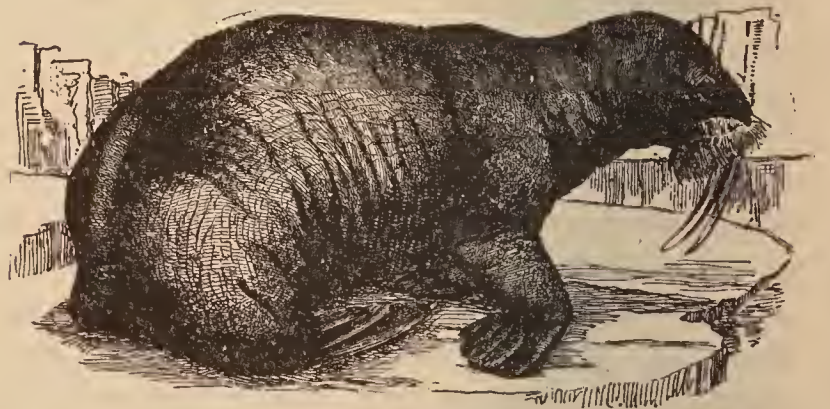
The nuts, which are encased in a woody shell, are deliciously flavored, but are of comparatively little commercial importance because the oil in them soon becomes rancid. The white walnut, or butternut, is found from New England to Georgia and as far west as Kansas. Wide-spreading and lofty, reaching a height of seventy-five feet or more, it is one of the handsomest of American forest trees. The compound leaves and green husks are clammy and hairy, the sap is sugary, like that of maple, and the root is mildly cathartic. The nuts are good to eat, either green, made into pickles, or dried.

WALPOLE, *wawl'pole*, HORACE, Sir, fourth Earl of Orford (1717–1797), an English man of letters, the son of Sir Robert Walpole. He received his education at Cambridge, and following his graduation spent several years in travel. In 1741 he entered Parliament. His first publication was *A Catalogue of Royal and Noble Authors*, which was followed in 1764 by *The Castle of Otranto*, a romance abounding in mystery, which was at the time of its publication very popular. Walpole is, however, chiefly remembered for his *Letters*, which give entertaining pictures of the society of his day. While in general these pictures are true to life, they contain many inaccuracies and exaggerations and are therefore of little value to historians.

WALPOLE, ROBERT, Sir, first Earl of Orford (1676–1745), an English statesman. He was educated at Eton and at King's College, Cambridge, succeeded to his father's estate in 1700 and entered Parliament as

member for Castle Rising. In 1702 he was elected for King's Lynn, became an active member of the Whig party and soon distinguished himself by his business capacity and by his ease in debate. He was successively Secretary of War, paymaster of the forces and First Lord of the Treasury, Chancellor of the Exchequer and Prime Minister. This latter office he held for over twenty-one years, and, during his long administration the Hanoverian succession became firmly established, owing largely to his prudence and political sagacity.

WALRUS, *wol'rus*, a marine flesh-eating mammal, related to the seal, and inhabiting the colder climates. It is larger and heavier than the seal, and when full-grown will measure twelve feet in length, and weigh about 2,000 pounds. When young, it is covered with thick, dull brown fur, but as it gets older this falls out, and when full-grown the walrus has practically no fur or hair on his wrinkled skin. The most characteristic feature of the walrus family is the pair of large pointed tusks (canine teeth) which project downward from the upper jaw.



THE WALRUS

These tusks are of solid ivory, and are often from 20 to 30 inches in length. They are used both as tools and as weapons,—to dig up clams and other food, to climb on ice and rocks, and to defend themselves from foes, especially from the polar bear, their chief enemy. Two species are found, one in the Atlantic—in Greenland and Labrador, one in the Pacific—in the islands of Behring Sea, but their numbers are diminishing rapidly. They are hunted for their hides and oil, and for ivory, and by the natives on the Arctic coasts for food. They are either killed with the rifle or taken with harpoons.

WALTHAM, *wol'tham*, MASS., a city in Middlesex County, ten miles west of Boston, on the Charles River. It manufactures more watches than any other city in Massachusetts; its watch factories are among the

largest in the world. There are also large cotton and woolen mills, saddlery works, machine shops and foundries. It has a state armory and a public library. It was originally a part of Watertown, but was made a separate town in 1738. The city manager form of government was adopted in 1917. Population, 1920, 30,891.

WALTON, *wawl'ton*, IZAAK (1593-1683), the author of the famous *Compleat Angler*, a treatise on fishing. For a number of years he was in business in London, as a linen draper according to some accounts; as an ironmonger according to others. He retired at the age of fifty and devoted his remaining forty years to a life of cultured ease and pleasure. His first edition of *The Compleat Angler* appeared in 1653. It is to his exquisite delineations of rural scenery, the ease and unaffected humor of his dialogue and the delightful simplicity of his style that *The Compleat Angler* owes its charm.

WALTZ, *wawltz*, a dance of Bohemian origin, executed with a rapid whirling motion, the gentleman having his arm round his partner's waist. The music is written in triple time and consists of phrases of eight or sixteen bars. Several of these phrases are now usually united, to prevent monotony. Johann Strauss and his son of the same name are the most noted composers of waltzes. The *valse à deux temps* is a form of waltz in which two steps are made to each bar of three beats. *Classical waltzes* are musical compositions in waltz form, not intended for dance tunes. Of this style the composer Chopin is the greatest master.

WAMPANOAG, *wom pa no'ag*, a tribe of Algonquian Indians who once occupied the lands east of Narragansett Bay, as far north as Massachusetts. Their number was reduced from 30,000 to barely 1,000 by a fearful epidemic, and a subsequent war with the whites resulted in their complete destruction. Massasoit and his son Philip were famous men of the tribe. See MASSASOIT; KING PHILIP.

WAMPUM, *wom'pum*, white and purple shell beads used for ornament and circulated in colonial days as money among Indian tribes east of the Mississippi. Because of the fixed value given to wampum strings, they came to be accepted by the New England colonists in exchange for their own coins. In some localities six wampum beads

equaled a penny. It was the custom of the Indians to weave wampum beads into belts, in such a manner that the figures formed permanent records. Few transactions of any sort were considered complete without the passing of the belts, and wampum records were invariably used in the ratification of treaties. Many wampum belts of historic importance are preserved in the state archives at Albany, New York.

WANAMAKER, *wahn'a ma kur*, JOHN (1838-1922), an American merchant, capitalist and philanthropist. He was born in Philadelphia, Pa., and there received a common school education and began his business career as errand boy in a book store; later he was a salesman, and in 1861 he established a clothing house, which he enlarged into a general department store in 1876. In 1896 he opened a branch in New York City.

He helped to organize the Christian Commission, which assisted the soldiers during the Civil War; was chairman of several relief committees, and was prominent in the management of the Centennial Exposition. Wanamaker was appointed Postmaster-General in 1889 and performed his duties with energy and administrative ability. He also took great interest in religious work and actively supported the Young Men's Christian Association. As one of the founders of the Presbyterian Hospital and Bethany Dispensary, as originator and president of the first Penny Savings Bank and as a donor to numerous charities he has been one of the most influential men of his time.

WANDERING JEW. A legend, well known in almost all parts of the Christian world, says that while Christ was on his way to Calvary, bearing his cross, he was mocked by a Jew, who told him not to rest, but to hurry on with his burden. In reply, Christ said, "I go, but thou shalt tarry till I come." In consequence, the man has continued since to wander about the earth. He passes through his lifetime like any ordinary man, till he reaches one hundred years, and then he suffers a terrible sickness, after which he comes forth again young. This legend has been the subject of many literary works in prose, poetry and the drama. The most notable novel is *The Wandering Jew* by Eugene Sue.

WANDERING JEW, a creeping plant with glossy leaves having a silvery sheen and often a purplish cast. It grows in almost

any soil, and even in water; and the persistency with which it lives and its manner of growth are responsible for the name. The plant grows and spreads rapidly and is used to advantage in hanging baskets and along the sides of window boxes. In the warmer of the temperate climates the plants live out of doors and often attain a length of several yards.

WAP'ITI. See **ELK**.

WAR, *wawr*, a contest between nations or states (international war), or between parties in the same state (civil war), carried on by force of arms. It usually arises in the first case from disputes about territorial possessions and frontiers, unjust dealings with the subjects of one state by another, economic competition and oppression, questions of race and sentiment, jealousy of military prestige or mere lust of conquest. In the second case, it is owing to the claims of rival contenders for supreme power in the state, or to attempts to establish some important point connected with civil, religious or political liberty. In all cases the aim of each contending party is to overthrow or weaken the enemy, by the defeat or dispersion of his army or navy, by the occupation of important parts of his country, such as the capital or principal administrative and commercial centers, or by the ruin of his commerce, thus cutting off his sources of recuperation in men, money and material.

When war is carried into the territory of a hitherto friendly power, it is called an *aggressive*, or *offensive*, war; and when carried on to resist such aggression, it is called *defensive*. Previous to the outbreak of hostilities between states, the power taking the initiatory step may issue a *declaration of war*, which now usually takes the form of an explanatory manifesto, addressed to neutral governments (see **WAR, DECLARATION OF**).

During the progress of the struggle, certain laws, usages or rights of war have come to be generally recognized; such laws permit the destruction or capture of armed enemies, the destruction of property likely to be serviceable to them, the stoppage of their channels of traffic and the appropriation of everything in an enemy's country necessary for the support and subsistence of the invading army. On the other hand, though an enemy may be starved into surrender, wounding, except in battle, mutilation and all cruel and wanton devastation

are contrary to the rules of war, as are also bombarding an unprotected town, the use of poison and the employment of torture to extort information from an enemy. Works of art and the industries of peace are usually considered as exempt from destruction. The World War, however, showed that in actual conflict all these rules may be disregarded by a wanton adversary. A remorseless and cruel nation breaks every humane rule, and its opponents may retort with "reprisals." The supreme problem before civilization at the present time is not the mitigation, but the abolition of war.

When two nations are at war and it becomes necessary for them to communicate, it is customary to request the services of the embassies of some neutral powers, and the belligerents themselves do not meet until preliminary arrangements have been made by the neutrals; as, for instance, in the Russo-Japanese War, negotiations were carried on by the government of the United States. While terms of peace are being considered, or when for any reason the belligerents wish to meet, an *armistice*, or *truce*, is declared, during which there is a cessation of hostilities.

If one nation completely conquers another, the war ceases; though many matters must subsequently be settled by a *treaty* or by *grant*. The peace treaty of 1919 is the latest of a long series of agreements that have followed wars since civilization began. While as a whole treaties are based on the assumption that there will always be other wars, some of their provisions usually recognize the possibility of preventing war through international organization and coöperation.

Related Articles. Consult the following titles for additional information:

| | |
|-------------------|------------|
| Army | Navy |
| International Law | Neutrality |

WAR, DECLARATION OF, a formal announcement by one nation of its intention to begin hostilities against another, or a statement recognizing the existence of a state of war between the two nations. Under modern conditions, with such facilities for rapid communication as the telephone, the wireless telegraph, the ocean cable, etc., actual warfare is preceded by negotiations of longer or shorter duration. It sometimes happens that actual hostilities commence before the formal declaration of war, as in case of the Russo-Japanese War of 1904-1905. A more common procedure is for one nation to send

an ultimatum to the other, setting a definite time for a reply. In 1914, for example, Great Britain sent an ultimatum to Germany on August 4, demanding a reply to its request that Belgian neutrality be respected, and requiring an answer by midnight of the same day. Germany's failure to reply was followed by a war declaration on the part of Great Britain. The war resolution by which the United States entered the World War was a statement that war existed between the two countries because of illegal acts on the part of Germany. See WAR; WORLD WAR.

WAR, DEPARTMENT OF, that one of the executive departments of a government which has to do primarily with military affairs. The chief of the department in the United States is the Secretary of War, who is a member of the President's Cabinet. He carries out the orders of the President, who is commander in chief of the army. The War Department consists of a number of different bureaus, over the chiefs of which the Secretary has general control. The affairs of the War Department, however, are not confined strictly to military matters, for it exercises control over pensions, sea coast forts, river and harbor improvements, the military academy and the government of island possessions which require military supervision. The principal bureau chiefs are the adjutant-general, the inspector-general, the judge-advocate-general, the quartermaster-general, the commissary-general, the sergeant-general, the paymaster-general and the chiefs of ordnance, signal office, engineers and pensions. The department was created by act of Congress in 1789.

WARBLERS, a family of tiny, insect-eating birds, found throughout the western continent, about seventy species of which reach the United States. Their migration northward is made with great regularity, and in May and early June they are commonly observed everywhere in the Northern states. In nesting, however, most species seek the deep woods, some penetrating as far northward as the Hudson Bay and Yukon regions. Nearly all spend the winter in the tropics.

Some of the better known species of warblers are the *yellow warbler*, or *summer yellow bird*, which remains about Northern homes and parks throughout the summer; the *black and white warbler*, which creeps about the branches of trees in early spring;

the *myrtle warbler*, marked with four yellow patches on head, rump and wing; the *black-throated green* and the *black-throated blue warblers*, the *chat*, the *American redstart* and the *oven bird*. Some warblers have fine singing voices, but the greater number have only weak, lisping notes. Their nests are usually cup-shaped, woven of twigs and grasses and placed in trees or bushes. The eggs are from three to five in number.

WARD, a minor who has been placed under a guardian appointed by the courts and who becomes legally responsible for the protection of his rights. The child must obey his guardian; he may not marry without his consent and may not bring suit against him, though in cases of unjust treatment he may file a complaint with the court. In most cases wardship ceases with marriage and always when the ward becomes of legal age. See GUARDIAN.

WARD. See MUNICIPAL GOVERNMENT.

WARD, ARTEMUS. See BROWNE, CHARLES FARRAR.

WARD, ELIZABETH STUART PHELPS (1844-1911), an American author and philanthropist, born at Andover, Mass. Besides lecturing and engaging in work for the advancement of women and for social reforms, she also wrote a number of stories, including *The Gates Ajar* (1868), which passed through twenty editions in the year of its publication, *Beyond the Gates*, *The Gates Between*, *Hedged In*, *The Silent Partner*, *The Story of Avis*, *A Singular Life* and, in conjunction with her husband, the Rev. Herbert D. Ward, *Come Forth* and *The Master of the Magicians*.

WARD, MRS. HUMPHRY (1851-1920), the foremost woman novelist of twentieth-century England. She was born in Tasmania and was reared and educated in England. In 1872 she married Thomas Humphry Ward, a journalist. Matthew Arnold was her uncle.

After writing much for periodicals and publishing two works of fiction, which were not especially noteworthy, she brought out in 1888 *Robert*

Elsmere, a novel which became immensely popular and which won the favorable notice



MRS. HUMPHRY
WARD

of critics. Then followed *The History of David Grieve*, *Marcella*, *The Story of Bessie Costrell*, *Sir George Tressady*, *Helbeck of Bannisdale*, *Eleanor*, *Lady Rose's Daughter*, *The Marriage of William Ashe*, *The Case of Richard Meynell*, *Eltham House*, *Missing*, *Elizabeth's Campaign* and *Helena* (1920). The principal criticism passed on Mrs. Ward's novels, especially on her earlier ones, is that the purpose is made too prominent and that in all there is too great similarity of leading characters. But her characters are clearly drawn, her literary execution is excellent and her topics are always vital and timely.

WARD, JOHN QUINCY ADAMS (1830–1910), one of the foremost American sculptors of his day, was born at Urbana, Ohio. Before the Civil War he established himself in New York, and became known for his portrait busts of notable people. His statuette *The Freedman*, made in 1865, was so popular that thousands of copies were sold; his *Indian Hunter*, which also makes a strong popular appeal, was the first piece of statuary erected in Central Park, New York City. *The Good Samaritan*, a group commemorating the discovery of the efficacy of ether as an anaesthetic, is in Boston. Ward's bronze bust of Shakespeare, a seated figure of Horace Greeley and statues of George Washington and Thomas Jefferson are among his finest portrait statuary. Ward was identified with the leading art organizations of his time and labored unremittingly to elevate national ideals in the field of art endeavor.

WARFIELD, DAVID (1866–), an American actor who has achieved the highest success in several character portrayals. He was born at San Francisco and in that city began his stage career at a local theater at the age of twenty-two. He went to New York in 1890; in the ten years following he was connected with the Casino Theater and with Weber and Field's Music Hall. Later attracting the attention of David Belasco, Warfield was starred in *The Auctioneer*, one of his greatest successes. He was equally successful in *The Music Master*, and this placed him in the front rank of American actors. His later performances have been in the leading rôle of *The Return of Peter Grimm* and as "Van der Decken" in the play of the same name, based on the legend of *The Flying Dutchman*. Warfield's impersonation of an eccentric but kindly old

gentleman, pathetic and courageous in misfortune, has never been excelled by any American actor.

WAR'NER, CHARLES DUDLEY (1829–1900), an American editor and critic, born at Plainfield, Mass. He received his degree at Hamilton College in 1852, was admitted to the bar and for a time practiced law in Chicago. Entering journalism, he became, in 1860, editor of the *Hartford Press* and later of the *Courant*. As correspondent of American papers he made an extensive tour of Europe, and on his return, in 1884, he became one of the editors of *Harper's Magazine*, to which he contributed until his death. The first book by which he attained prominence was *My Summer in a Garden*, a volume of sketches, which was followed by *Backlog Studies*, *Being a Boy* and *As We Were Saying*. Among his other works are *The Gilded Age*, a drama in which he collaborated with Samuel L. Clemens, and *A Little Journey in the World*, a novel with a moral purpose. He edited the "American Men of Letters" series and *A Library of the World's Best Literature*.

WARNER, SETH (1743–1784), an American soldier, one of the leaders of the Green Mountain Boys, who opposed New York's claim to the New Hampshire grants. He was elected lieutenant-colonel of the Green Mountain Boys in 1775, and the following year was appointed colonel of the continental regiment. He received a colonel's commission for the part he took in the capture of Crown Point. He was in command at the Battle of Hubbardton and rendered efficient service in the Battle of Bennington. In 1782 he retired on account of ill health.

WAR OF 1812, the name given to the struggle between the United States and Great Britain in the years 1812–1814. The general cause of the war was the attitude of Great Britain in relation to American shipping. Its claims to the right to board and search American vessels for the purpose of impressing British citizens, found in their crews, into the British service; its decrees and orders to the detriment of American commerce; its disregard of American protests, which had been a cause for grievance to the Americans for many years, at last compelled them to attempt to secure reparation by force. The same haughty actions regarding American commerce had been taken by France, and it was long a question as to which of the

two powers the United States would fight first; but the proximity of Canada, which seemed to offer an attractive field for conquest, and the old ill-feeling toward England, resulting from the Revolution, finally caused the declaration of war against Great Britain, on June 18, 1812. Five days later the British government withdrew the "Orders in Council," which had been probably the most objectionable features of the British policy, since they established a paper blockade of European ports and practically excluded American commerce from the seas.

At the outset the land forces of the United States made little headway. Great Britain, with her vastly superior resources, was prepared for war, having been at war with France for many years, while the United States government had shown a shameful lack of appreciation of the dangers attending the new republic and had allowed the navy and war departments to deteriorate almost out of existence. The first military movement was that of General Hull, who invaded Canada with two thousand men, but soon retreated before an inferior force under General Brock and surrendered at Detroit, August 16. In October of the same year, General Van Rensselaer made another invasion of Canada near Niagara Falls, and after the Battle of Queenstown, in which the British general, Brock, was mortally wounded, the Americans were again driven back with great loss. Meantime, on the sea the United States vessels had held their own. The *Constitution* had captured the British frigate *Guerriere* (August 19). The *Wasp*, after a sharp battle, took the *Frolic*. The *United States* captured the *Macedonian*, and in December the *Constitution* compelled the surrender of the frigate *Zava*.

Of the American navy it can be said that at the beginning of the war there were practically no war vessels owned by the government. So badly in need of a naval arm was the country that privateers (which see) were licensed. A few naval vessels were assembled; these in 1812 and 1813 gave so good an account of themselves in action that the

naval history of the war was remarkable. American valor on the sea made forever memorable such names as the *Constitution* ("Old Ironsides"), the *Wasp* and others scarcely less notable.

In the spring of 1813 General Dearborn, who had been placed at the head of affairs in the Northwest, invaded Canada for the third time, with an army of 1,700 men, and captured York (Toronto). He was relieved by Generals Wilkinson and Hampton, who made an attempt to take Montreal, but without success. In May an advance of the British into New York State was repulsed at Sackett's Harbor, and in September Commodore Perry fought the famous Battle of Lake Erie, by which he captured the most important British fleet upon the Great Lakes. This victory enabled General Harrison to invade Canada. There he defeated General Proctor, in the Battle of the Thames.

In 1814 General Jacob Brown again invaded Canada, captured the British Fort Erie and defeated the force under General Riall at Chippewa. Then followed the Battle of Lundy's Lane and the withdrawal of the Americans to Fort Erie, where they were



MAP OF MAIN OPERATIONS

besieged. In the following September, General Provost led 14,000 men in an invasion of New York, by way of Lake Champlain. The fleet which he had got together was defeated near Plattsburg by an American fleet under Commodore McDonough, while the land force was also repulsed. At about the same time, the British fleet ascended Chesapeake Bay, defeated the hastily sum-

moned American militia at Bladensburg, entered Washington and sacked the government buildings, in retaliation for the sack of York at its capture.

Meanwhile, General Andrew Jackson had been fighting the Creek Indians in the extreme South and had gathered together an army of Kentucky and Tennessee frontiersmen. In January, 1815 this force was confronted by an army sent direct from England, under General Pakenham, and consisting of the veterans of Wellington's campaign against Napoleon. The result was the famous Battle of New Orleans.

On the sea the Americans continued to gain the upper hand, though the *Chesapeake* was captured by the *Shannon*, and other small American vessels were taken. Probably the most memorable event upon the sea during this period was the famous cruise of the American frigate *Essex*, which, after a long and brilliant career against British merchantmen, was compelled to surrender to the *Phoebe* and the *Cherub* in the Pacific Ocean, March 28, 1814. The very month in which the treaty of peace was signed, December, 1814, the Federalists of New England declared their opposition to the war. The Treaty of Ghent provided for the restoration of all lands captured by either side and for a commission to determine the boundary between the United States and Canada. It did not provide for the withdrawal of the British claims regarding right of search, the paper blockade and the laws of neutrality. These practices had already been discontinued by the British, on demand of their own merchants, and were never revived.

Related Articles. Consult the following titles for additional information:

| | |
|-------------------------|-----------------------------|
| Blockade | New Orleans, Battle of |
| Brock, Sir Isaac | Perry, Oliver H. |
| Champlain, Lake | Queenston Heights, |
| Constitution (ship) | Battle of |
| Continental System | Raisin River, Massacre of |
| Embargo | Star-Spangled Banner |
| Erie, Lake, Battle of | Thames River, Battle of the |
| Ghent, Treaty of | Tippecanoe, Battle of |
| Hartford Convention | United States (history) |
| Hull, William | |
| Jackson, Andrew | |
| Lawrence, James | |
| Lundy's Lane, Battle of | |
| Milan Decree | |

WARRANT, a writ issued by any qualified court officer directing a constable or sheriff to arrest the person named therein and bring him before the official issuing the warrant. A warrant is usually issued upon the oath of a complaining witness as to the guilt of the person concerned. Ar-

rests without a warrant are illegal, except in time of public danger, or when an overt act is witnessed by a peace officer.

WARREN, JOSEPH (1741-1775), an American patriot, born at Roxbury Mass. He was graduated from Harvard College and became a physician at Boston and a leading figure in Massachusetts political movements, contributing with voice and pen to the cause of patriotism. He drew up the "Suffolk resolves," the most radical expression of the American position with respect to British oppression, and in the following year, 1775, was elected president of the provincial congress of Massachusetts. Although the rank of major-general of Massachusetts forces had been conferred on him, and he was offered chief command at Bunker Hill, he took his place as a volunteer and was killed in the fight of June 17. A monument in his memory erected in 1794, on the spot where he fell, was later replaced by the Bunker Hill Monument (which see).

WAR'REN, OHIO, the county seat of Trumbull County, fifty-two miles southeast of Cleveland, on the Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is said to be the second city in the United States in the manufacture of electric lamps. Other manufactures are fire extinguishers, automobiles, storage tanks, steel ranges, shovels, bath tubs, boilers and furniture. It has a Federal building, a public library and a hospital. The town was first settled in 1802 and was incorporated in 1834. Population, 1910, 11,129; in 1920, 27,050, a gain of 144 per cent.

WAR'REN, PA., the county seat of Warren County, sixty-six miles southeast of Erie, on the Allegheny River and on the Pennsylvania and the New York Central railroads. It is surrounded by a rich gas and oil district, and is the center of large petroleum industries. There are also boiler and machine shops and furniture factories. The state hospital for the insane is here. Warren was settled in 1780, and was incorporated as a borough in 1832. Population, 1910, 11,140; in 1920, 14,256.

WAR'SAW, POLAND, capital and largest city of the republic, is situated on the left bank of the Vistula, 625 miles south of Petrograd and 320 miles east of Berlin. The city is built upon a hill, which slopes toward the river, and is connected with its suburb, Praga, by an iron bridge. The old

part of the town is characterized by narrow winding streets and quaint buildings, erected during the Middle Ages. It is enclosed by a wall, which is entered through a number of gates. Around this part of the town are the suburbs, which are of a more modern structure. In Castle Square stands the castle of the old Polish kings. The Roman Catholic Cathedral of Saint Johns, dating from the thirteenth century; the Church of the Holy Virgin, dating from the fifteenth century, and the Church of Saint Anne, of about the same date, are also of interest. The city contains a number of public monuments, among them an obelisk erected to the memory of the Polish generals who fell in 1830. The educational institutions include a university, an observatory, a polytechnic institute, a conservatory of music and a museum of fine arts.

Warsaw is an important industrial center, and its leading manufactures include machinery, chemicals, food products, matches, spirits, tobacco, and boots and shoes. The city itself is not fortified, but protecting it are some of the greatest fortresses in the world. These, with the city itself, were taken by the Germans in 1915 during the World War. After the liberation of Poland at the close of the war, Warsaw became the capital of the newly-organized republic (see, POLAND; WORLD WAR). Population, 1914, about 909,000.

WARSHIP. See NAVY; SUBMARINE; TORPEDO BOAT.

WART, an excrescence of the skin caused by hardening of the papillae. Warts are usually the result of some form of irritation, and appear most commonly on the hands of children. They may disappear after a time, or may persist through life. There have been many superstitious beliefs as to methods of removing warts, but the only reliable way is that of having them cauterized by a physician, or treated with lactic acid or a similar chemical. Senile warts result from a breaking down of the skin, favored by irritation or lack of cleanliness, and are usually found on the back, neck and arms.

WART HOG, a wild pig, native to Africa. It stands about three feet high, having rather long legs. The face is rendered extremely hideous by large tusks and wart-like protuberances under the eyes and at each side of the huge snout. The coarse hair, short on the rest of the body, is long on the

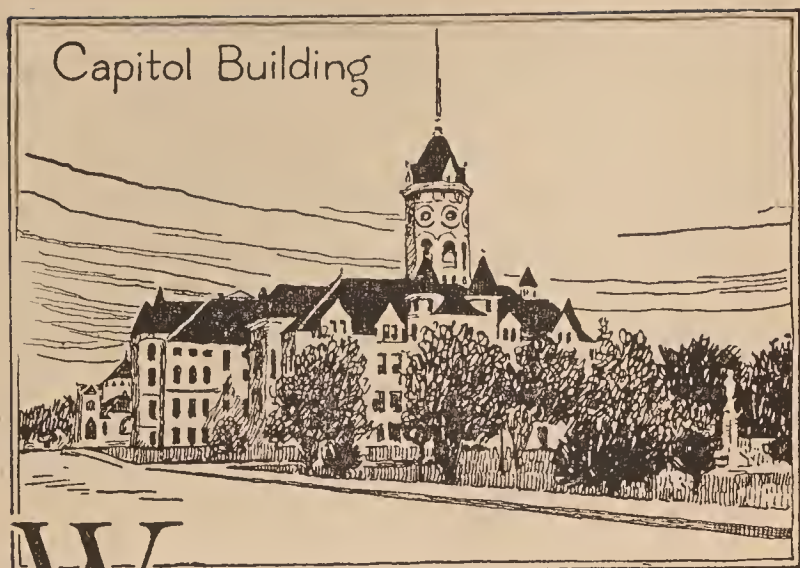
back and hangs in a mane on the neck. These hogs roam in small groups in search of food, and are destructive to crops. There are two principal species, one in Abyssinia and Somaliland, and the other in South Africa.

WAR'WICK, R. I., in Kent County, five miles south of Providence, on Narragansett and Cowesett bays, on the Pawtucket and Providence rivers and on the New York, New Haven & Hartford Railroad. It is an important industrial center and contains cotton factories, foundries, machine shops and other establishments. The place was settled in 1642 and was called Shawomet until named in honor of the Earl of Warwick, in 1648. Nathaniel Greene was born in the town. Population, 1910, 26,629; in 1920, 13,481, a loss of 49 per cent.

WARWICK, RICHARD NEVILLE, Earl of, called the "king-maker" (1428-1471), an English soldier and statesman. He was the son of the Earl of Salisbury and became Earl of Warwick after marrying the heiress of the Warwick title and estates. Taking the Yorkist side in the Wars of the Roses, he was the main instrument in placing Edward IV on the throne in 1461, in place of Henry VI, and he became the most powerful nobleman in the kingdom. He quarreled with Edward, however, on account of the latter's marriage, went over to Henry's side and was able to place him again on the throne, but was defeated and slain at the Battle of Barnet. He is the "last of the barons" in Bulwer-Lytton's novel of that title.

WASATCH, *waw'satch*, **MOUNTAINS**, a range belonging to the Rocky Mountain system. It extends from Southeastern Idaho to Southwestern Utah, forming the eastern boundary of the Great Basin in which lies the Great Salt Lake. The mountains rise abruptly from the plain and reach an average height of 10,000 feet. The highest peak, Mount Belknap, reaches 12,000 feet above sea level. The peaks, covered with perpetual snow, are the source of numerous streams, and the region is broken by canyons. Below the snow-line dense pine forests cover the slopes. Coal, iron and silver are mined.

WASHBURN COLLEGE, a Congregational institution of higher learning, established in 1865 at Topeka, Kansas. There is a school of liberal arts and instruction is also given in engineering and law. There is also a preparatory school. The attendance is 850; faculty, 80.



WASHINGTON, a prosperous and progressive state of the American Union, situated in the extreme northwestern part of the country, south of the International boundary and on the Pacific coast. Its popular name, the EVERGREEN STATE, refers to its wealth of fir forests. About seventy per cent of the surface is forest-covered, and in the annual production of lumber Washington is the leading state in the Union. The rhododendron is its flower emblem.

Location and Area. The state is bounded on the north by the Canadian province of British Columbia, the forty-ninth parallel forming the line between the two divisions. Extending into the northwestern part of the state is the irregular, much-branching inlet, Puget Sound, which is connected with the open ocean by the straits of Juan de Fuca and Georgia. Between these straits lies the island of Vancouver, which is wholly Canadian territory, though it extends south of the international boundary. Washington touches the northern extension of Idaho on the east, and along most of its southern border it is separated from Oregon by the Columbia River.

With an area of 69,127 square miles, of which 2,291 square miles are water the state is the nineteenth in size, having but 293 square miles less than the state of Missouri. Washington is about two-thirds the size of Oregon, its southern neighbor, and if placed on the province to the north, would occupy less than one-fifth of that area.

People and Cities. In 1920 the population of the state was 1,356,621, an average density of 20.3 to the square mile. Washington then ranked thirtieth in population. In January, 1910, according to the Federal census, the population was 1,141,990.

Of the foreign-born groups, who number in all about 257,000, the most prominent

numerically are Canadians, Swedes, Germans, English and Irish. The state has eighteen Indian reservations, with a total population of about 11,000. There are also large numbers of Japanese, Chinese and negroes.

The largest religious bodies are the Roman Catholic, Methodist, Presbyterian, Lutheran, Baptist and Congregationalist denominations.

According to the Federal census for 1920, Washington has ten municipalities with populations exceeding 10,000. There are three large cities—Seattle (315,312), Spokane (104,437) and Tacoma (96,965). Other important cities are Everett, Bellingham, Walla Walla and Olympia, the capital.

Surface and Drainage. The Cascade Mountains cross the state from north to south about 120 miles east of the coast, and divide it into two unequal parts, Eastern Washington and Western Washington. These mountains form the chief physiographic feature of the state and have a mean elevation of about 8,000 feet. Their eastern slope rises gradually from the interior plateau, but the western slope is steep and broken. The range contains a number of lofty peaks whose summits are covered with perpetual snow. The most noted among these are Mount Tacoma, 14,408 feet, now enclosed in a national park, Mount Adams, 12,470 feet, Mount Baker, 10,827 feet and Mount Saint Helens, 10,000 feet. Eastern Washington, which includes nearly two-thirds of the state, contains the Columbia River Basin, which is by far the largest natural division of surface within the state. Within this basin are the great irrigated and grain-growing districts and a number of fertile valleys. In the southeastern part the Blue Mountains rise to an altitude of about 6,000 feet.

Western Washington is naturally divided into three physiographic regions—the Puget Sound Basin, including the territory between the Olympic and Cascade mountains, and surrounding the great inland sea, Puget Sound; the Olympic Peninsula, including that portion of the state containing the Olympic Mountains and the region extending from them to the Pacific, and the southwestern division, which occupies the region fronting on the Columbia River and Pacific Ocean and extending northward until it meets the Olympic Peninsula. The Olympic

Mountains are the northern extension of the Coast Range.

The eastern section of the state, or Eastern Washington, is drained entirely by the Columbia River and its tributaries. This river enters the state near the northeastern corner and flows south by west then westward in an irregular course, then southward and southeastward until it reaches the southern boundary, when it makes a sharp turn to the west and pursues its course to the Pacific. These changes in direction form what is known as the Great Bend in the Columbia River, and this is for a part of the way the western boundary of the plateau. The chief tributaries of the Columbia are Clark Fork, from Idaho; the Snake, which flows through the southeastern corner of the state; the Spokane, the Okanogan, the Methow, the Wenatchee and the Yakima. Western Washington is drained into Puget Sound and the Pacific. In this section all of the rivers are short and comparatively unimportant, the most important being the Cowlitz, flowing southward into the Columbia, the Chehalis, flowing directly into the Pacific, and the Skagit, which enters Puget Sound. The state contains a number of mountain lakes, the largest being Lake Chelan.

Climate. The Cascade Mountains divide the state into two climatic regions. Eastern Washington is characterized by hot summers, cold though not severe winters and light rain-falls, the annual average being about sixteen inches. In many sections irrigation is necessary to successful agriculture. Except upon the high altitudes there are many hot days during the summer. During the winter there are heavy falls of snow, which are welcomed by the farmers, because as the snow on the lowlands melts, it is absorbed by the soil, and that upon the mountains during the summer feeds the streams which supply water for irrigation. The climate of Western Washington is mild and moist. The prevailing westerlies, blowing moisture-laden from the sea, strike the cool slopes of the mountains and have their moisture condensed. West of the Cascades the annual rainfall varies from twenty to 132 inches. The winters are mild and the summers are free from extreme heat.

Mineral Resources. There are extensive deposits of coal in the Puget Sound Basin, notably in King, Pierce, Lewis, Whatcom and Thurston counties, also in Kittitas county, east of the Cascade Range. About 3,000,000

tons of coal are mined annually. Both bituminous and lignite varieties are found. The coal deposits of Washington are the only ones of any great extent on the Pacific coast.

Veins of ore producing gold, silver, copper, lead, quicksilver and a number of rare metals occur throughout the mountainous regions. Gold and silver are mined in Whatcom, Skagit, Snohomish, King, Pierce, Lewis, Skamania, Cowlitz, Okanogan, Chelan, Kittitas, Yakima, Klickitat, Ferry and Stevens counties. Iron ore, and marble, granite, onyx, serpentine, limestone and sandstone occur in large quantities. Beds of fire clay, kaolin, talc and asbestos are among the valuable resources of the state. The value of the total annual output is about \$12,000,000.

Fisheries. The waters of Puget Sound, the Columbia River and the indentations along the Pacific coast abound in excellent food-fish, and in the lakes and streams are found large quantities of fresh-water fish. The most important branch of the fisheries is catching and curing salmon (see SALMON). Second in point of value are the halibut fisheries. Large quantities of oysters, shrimps, clams and cod are also taken. In value of products of the fisheries Washington ranks fourth among the states.

Agriculture. Washington has a wide variety of soils. On the uplands of Eastern Washington wheat and other cereals are raised in large quantities. In the diked lands along Puget Sound oats are raised, and in the southeastern part barley constitutes the important crop. Rye, buckwheat and flax are also grown, and in some counties hops are a staple product. Many large irrigated areas east of the mountains are devoted to alfalfa; the state produces nearly 2,000,000 tons of hay annually. Potatoes, beets and other vegetables thrive and yield large returns.

Washington is also becoming one of the most important fruit-growing states of the Union. In the valleys of Eastern Washington there are thousands of orchards, and they are increasing each year in number and extent. This region is especially valuable for the raising of apples, pears, peaches, plums and cherries. In the western part of the state small fruits are raised in large quantities, and grapes are grown upon both sides of the mountains.

The mild winters and excellent pasturage make the raising of live stock profitable, and

large numbers of cattle, horses, sheep and hogs are found. For all of these there is a ready market. Dairying is also profitable and can be practiced under ideal conditions.

Manufactures. Washington has abundant water power and a vast forest area. Because of these conditions, lumbering and its allied industries—the manufacture of doors, sash, shingles and furniture—constitute the leading manufacturing industry, in which over 200,000 men are employed. Lumber mills are quite generally distributed through the forest regions, but the most extensive establishments are found in the large forests of Western Washington. The total annual value of the output is about \$90,000,000, which is greater than that of any other state.

The products of the flour and grist mills are second in value, the most important commodity of the industry being white flour. Slaughtering and meat packing, the canning and curing of fish, printing and publishing and railroad-shop construction and repair are all prosperous lines of activity. Seattle, Tacoma and other ports have developed as centers of shipbuilding, especially after the outbreak of the World War. Seattle is the chief manufacturing city of the state, with Tacoma, Everett, Bellingham, Aberdeen, Walla Walla and Yakima following.

The mineral resources have given rise to various other industries.

In the Puget Sound Basin large quantities of lime are produced. Granite is quarried in Snohomish and Spokane counties. In other localities valuable sandstone occurs, and onyx of great variety and beauty is quarried in Stevens County. In King County are factories for the manufacture of brick, tile, terracotta, stoneware and sewer pipe. Portland cement is produced in Skagit County, and iron and steel in Jefferson County.

Transportation. Puget Sound and the Pacific Ocean have a coast line exceeding 2,000 miles in extent. The largest ocean ships can sail on the Sound as far as Seattle and Tacoma, which are the chief harbors of the state. Three transcontinental lines of railway cross the state from east to west. Railway lines extend north and south from the great centers of trade on Puget Sound, and connect all important cities and towns in the state and with cities in British Columbia. The most important roads are the Northern Pacific, the Oregon & Washington,

the Great Northern, the Chicago, Milwaukee & Saint Paul and the Spokane, Portland & Seattle. The total mileage of the state is about 7,000.

Government. The legislature consists of a house of representatives, that cannot exceed ninety-nine members or be less than sixty-three, and a senate, whose number cannot exceed one-half, or be less than one-third of the number of representatives. The representatives are elected for two years, and the senators are elected for four years. The legislature meets biennially, and the regular sessions are limited to sixty days. The executive department consists of a governor, a lieutenant-governor, a secretary of state, a treasurer, an auditor, an attorney-general, a superintendent of public instruction and a commissioner of public lands, elected for four years. The courts consist of a supreme court of nine judges, elected for six years, and a superior court in each county, presided over by a judge elected for four years. Women and men vote on equal terms.

Education. The public schools are under the direction of the superintendent of public instruction and a board of education. The schools are organized on the district plan, and each district must maintain a school for at least five months in the year. Education is compulsory between the ages of eight and fifteen. The school fund is derived from state and local taxes and from income from the permanent fund derived from the sale and lease of school lands. The state university is at Seattle, and normal schools are maintained at Bellingham, Cheney and Ellensburg. The state agricultural college is at Pullman. Among the denominational schools are, Gonzaga College, at Spokane, Whitman College, at Walla Walla, and College of Puget Sound, at Tacoma.

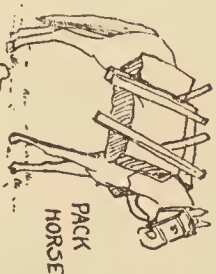
Institutions. The schools for the deaf and the blind are at Vancouver. The hospitals for the insane are at Fort Steilacoom, Sedro Woolley and Medical Lake, and there is a soldiers' home at Orting and a veterans' home at Port Orchard. The penal institutions consist of the penitentiary at Walla Walla and the reformatory at Monroe. The state training school is located at Chehalis.

History. For early history, see OREGON, subhead *History*. The territory of Washington was separated from Oregon in 1853, and soon afterward the discovery of gold led to an influx of settlers, which in turn induced



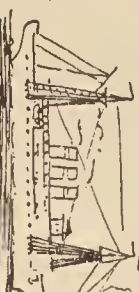
RHODODENDRON
STATE FLOWER

WASHINGTON THE EVERGREEN STATE



PACK
HORSE

OCEAN
VESSEL ON
PUGET SOUND



C. Flattery

PRODUCTS

FROM THE MINE

GOLD
SILVER

LEAD
COAL

IRON
LIMESTONE

FROM THE FARM

APPLES & PEARS

CORN

ALFALFA

PRUNES

HOPS

WHEAT

TOBACCO

FROM THE SEA

SALMON (First)

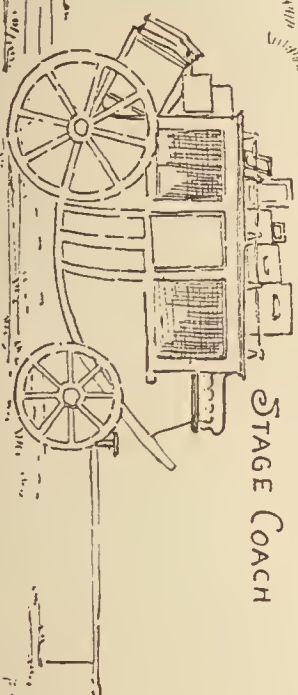
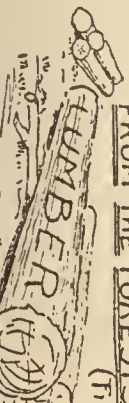
HALIBUT

STURGEON

FLOUNDERS

OYSTERS

FROM THE FORESTS (First)



STAGE COACH

SPokane

OLYMPIA

SEATTLE

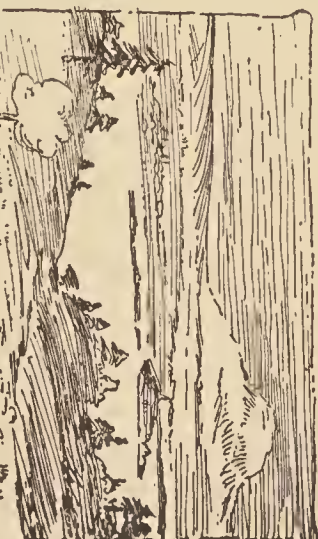
OTACOMA

SCADIA MOUNTAINS

Columbia River

Columbia River

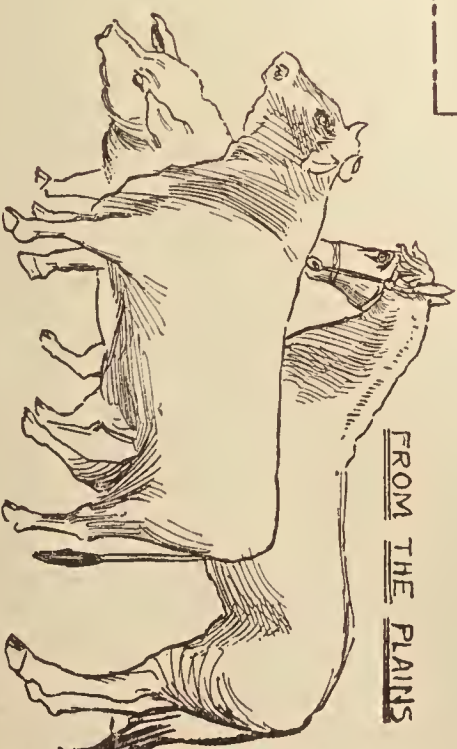
MOUNT
RAINIER



SPokane Falls



FROM THE PLAINS



Items of Interest on Washington

Three-fifths of the shingles manufactured in the United States are made in Washington.

The area of the national forest lands is nearly 10,000,000 acres.

The northern boundary of the state was fixed by treaty in 1846. In the Presidential campaign of 1844 the popular slogan of the Democrats, "Fifty-four forty or fight," had reference to this boundary.

Girls and boys between fifteen and sixteen who are unemployed are compelled to attend school.

Between 1900 and 1910 the population of the state increased 120.4 per cent.

Suffrage was granted women in 1910.

Among the native whites the illiteracy averages but three-tenths of one per cent.

The slopes of the Olympic Mountains have deep gorges and dense forests of fir, and are almost inaccessible.

In Seattle there is the tallest office building in the world outside of New York.

Questions on Washington

Where are the Cascade Mountains?
Of what is the Columbia Plateau composed?

What is the principal drainage system in the state and which are the important tributaries?

How many acres in the national forest reserves?

How do the fisheries rank among the states of the Union?

What is the value of the annual output of minerals?

What are the leading crops?

What is the principal manufacturing industry?

How does the value of its products compare with that of other states?

Name four other important industries.

Why are Spokane, Tacoma and Everett important?

What was meant by the slogan "Fifty-four forty or fight"?

the Indians to plan a massacre, known as the Washington-Oregon War, in 1855. Indian troubles continued to appear from time to time, but the constant increase of white population finally led to the abandonment of the territory by the Indians. After the Civil War, there were violent anti-Chinese agitations, which for a time retarded this territory's growth. Numerous attempts were made to secure statehood, and in 1889 the Omnibus Statehood Bill, admitting the two Dakotas, Montana and Washington, was signed by the President, and Washington became a state. The growth in the population and wealth of Washington since its admission has been uninterrupted. In January, 1916, prohibition went into effect.

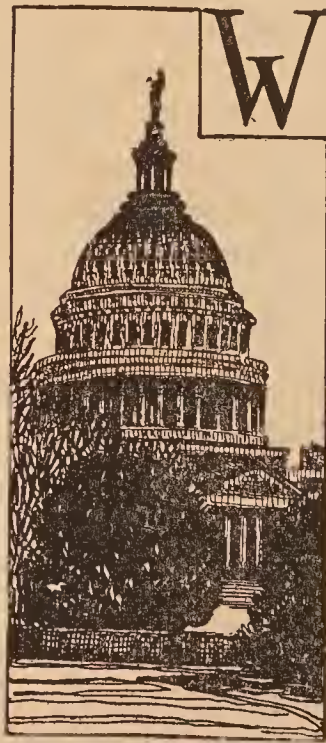
Related Articles. Consult the following titles for additional information:

CITIES

| | | |
|------------|---------|-------------|
| Aberdeen | Olympia | Vancouver |
| Bellingham | Seattle | Walla Walla |
| Everett | Spokane | Yakima |
| Hoquiam | Tacoma | |

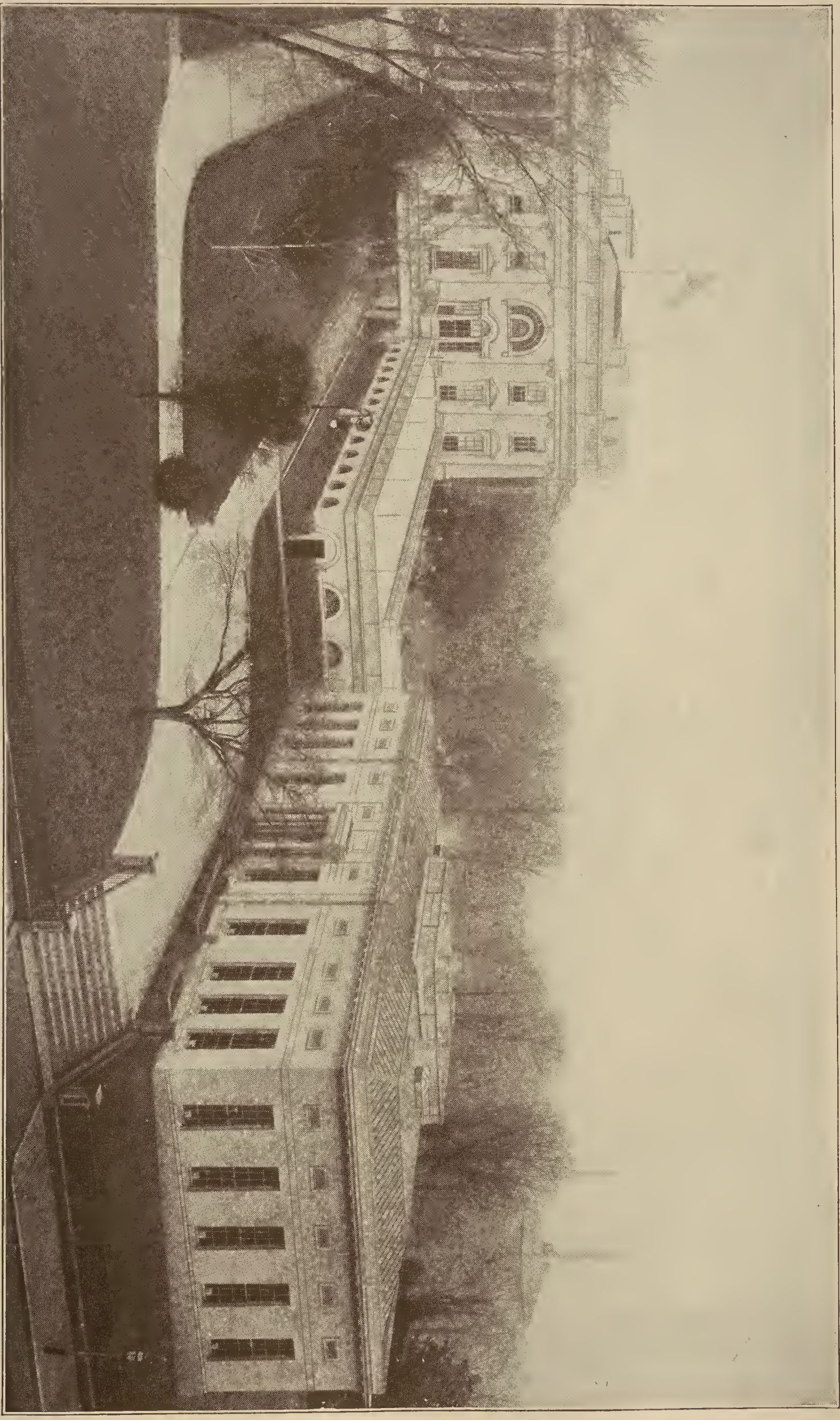
MOUNTAINS AND RIVERS

| | |
|----------------|----------------|
| Cascade Range | Rainier, Mount |
| Coast Range | Snake River |
| Columbia River | |



WASHINGTON, the capital of the United States of America, named for the first President of the republic, and located on a site chosen by him. It lies on the Potomac River, 156 miles from Chesapeake Bay and 185 miles from the Atlantic Ocean, 135 miles southwest of Philadelphia and 223 miles southwest of New York. Chicago is 811 miles northwest, and Atlanta 648 miles southwest. Washington is coextensive with the District of Columbia, which covers an area of about seventy square miles. The southwestern border is formed by the Potomac River, into which flow Rock Creek and the Anacostia River. The latter forms the southeastern boundary. Rock Creek was the western boundary before the city spread to its present limits, but Georgetown and various suburban districts west of the Creek are now legally included within the boundaries of Washington.

The population was 331,069 in 1910; in 1920 it was 437,571, according to the census of that year.



WHITE HOUSE, WASHINGTON

Showing western extension, containing President's business offices. A like extension has been added to the east side of the original building.



THE WASHINGTON MONUMENT

Plan of the City. Washington was laid out according to suggestions made by President Washington who employed Pierre Charles L'Enfant, a French civil engineer, to prepare the plans for the proposed city. It is said that L'Enfant rode over the ground with the President and commissioners and grew enthusiastic over the location, deeming it a fit site for the capital of a "mighty empire." Jefferson furnished L'Enfant with plans of the great cities of Europe, but the French engineer, faithful to the inspiration he had received from Versailles, determined to have broad avenues, vistas, streets and parkings, which make Washington truly the "City of Magnificent Distances." The Capitol was located on a hill, which was then a thick wood; the lines of latitude and longitude which marked its center were carefully surveyed, and the streets and avenues were laid from this point with mathematical exactness. It was manifestly the intention that the chief front of the Capitol should be toward the east, and that the public buildings should be placed about that side; but many forces contributed to change this idea, and now the west front, with its great terraces topping the hill and with its magnificent stairways extending far down the side, is worthy to be called the main entrance.

From the middle of the four sides of the site of the Capitol extend four great streets, which separate the city into quarters, known as North West, North East, South West and South East. These four streets are known as North and South Capitol, East Capitol and the Mall. The latter is a beautiful park area, which takes the place of a West Capitol street. The streets running parallel to East Capitol and the Mall are named, both north and south, for the letters of the alphabet. The streets parallel to North and South Capitol are numbered consecutively east and west. Broad avenues, named for the states, traverse the city from northwest to southeast and from northeast to southwest. All of this will be clearly understood if the reader will study the accompanying map. In locating any place it is necessary, of course, to mention the quarter of the city. When this is done, the location is very definite; for instance, 1850 F Street N. W., would be known to lie between Eighteenth and Nineteenth streets on F Street, in the northwestern part of the city. In the addressing of mail to the North West section, it is custom-

ary to omit the letters N. W., but those for the other three sections should always be written.

The North West quarter of the city contains most of the business houses, the finest residence section and most of the government buildings. Pennsylvania Avenue, the principal business street, extends northwest from the Capitol for about a mile to the Treasury building; there it bends sharply to the north and again to the west, here passing in front of the Executive Mansion and the State, War and Navy building; beyond that it turns again to the northwest and extends into Georgetown. Seventh, Ninth and F, N. W., are among the important business streets (see subhead *Parks and Boulevards*).

Washington is connected with Baltimore, New York, Philadelphia, Chicago and other large cities, east and west, by the Baltimore & Ohio, the Pennsylvania and other railroads. All trains run into the magnificent Union Station, north of Capitol Hill. Within the city, transportation is rendered easy by fine systems of electric railways, which traverse all the principal streets and run to the public buildings. Electric railways also connect Washington and Mount Vernon, Arlington and other points of interest.

Parks and Boulevards. The park surrounding the Capitol occupies sixteen city blocks, crowning a hill fifty-eight feet high, overlooking the west half of the city. It is laid out with drives and walks, bordered by magnificent trees and beautiful shrubbery, interspersed with beds, in which blossom the flowers of the season. The small ornamental buildings, fountains and statuary lend a peculiar charm to the whole park.

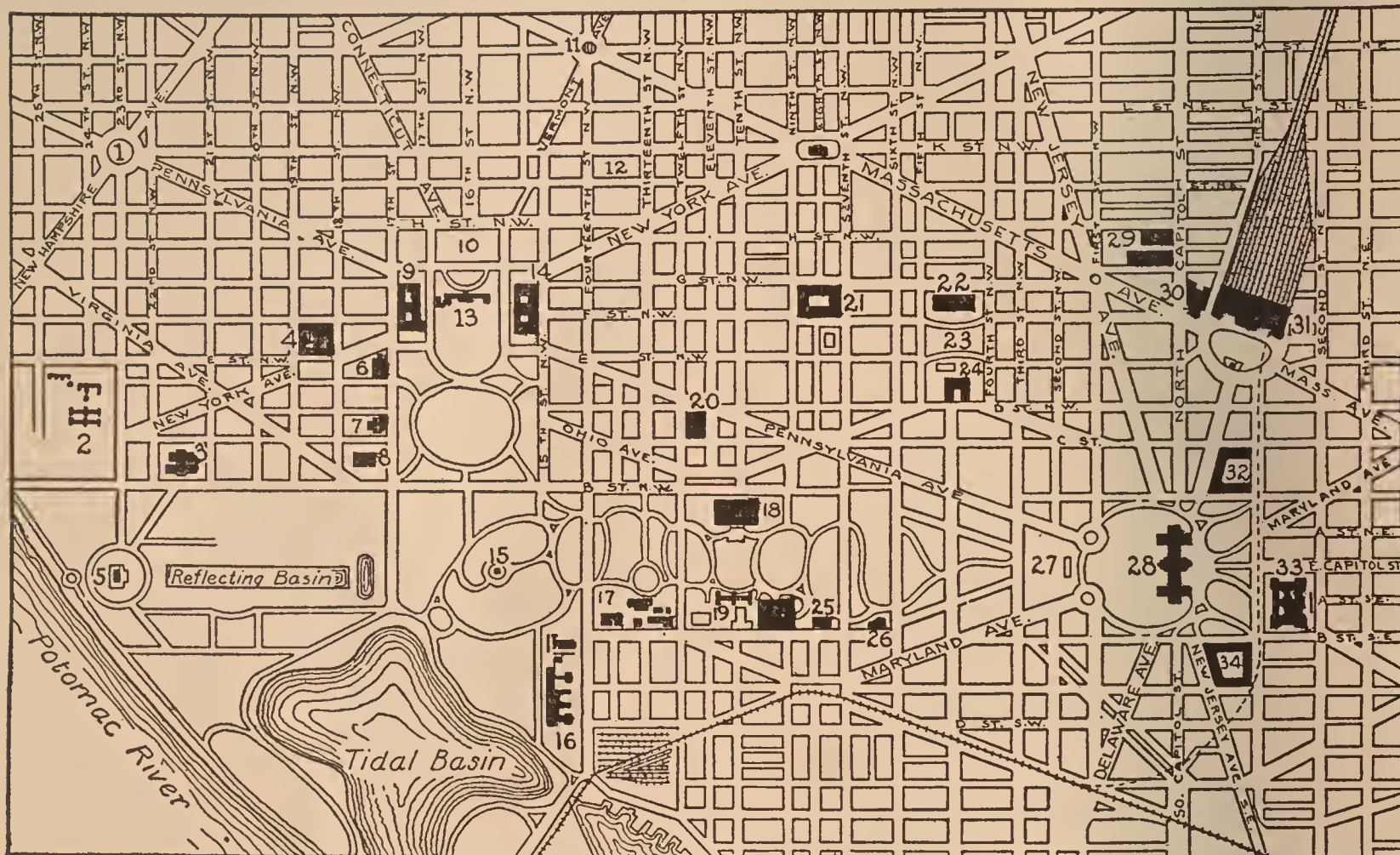
From the west front of the Capitol a person looks down upon the broad Mall, which extends about a mile to the imposing Washington Monument, and then on to the Lincoln Memorial. In the immediate foreground, between the Mall and the Capitol, are the government conservatory and botanical gardens, in which may be seen foreign and native herbs, shrubbery and trees in profusion. Trees, shrubs and plants beautify the walks and drives of the Mall, also, along whose west side are grouped several of the finest public buildings. Running north from the west end of the Mall are the Executive grounds, a magnificent tract, which, with the private gardens of the White House, cover about twenty city squares. In front of the

White House and across Pennsylvania Avenue is Lafayette Square, another exquisite park, adorned with fine statuary.

The intersections of the avenues and streets throughout the city form squares and circles which are public gardens filled with statuary, flowers and shrubs. Other parks in different parts of the city afford resting places for

a city filtration plant. In the spring, when the foliage is fresh and the flowers in the parks in full bloom, no more beautiful city is to be found, for the streets are all broad and open and, in the better parts of the city, smoothly paved with asphalt.

Public Buildings and Institutions. Chief of all the public buildings is the Capitol,



MAP AND KEY OF WASHINGTON, D. C.

- | | | |
|----------------------------------|---------------------------------------|---------------------------------|
| 1. Washington Circle. | 12. Franklin Square. | 23. Judiciary Square. |
| 2. U. S. Naval Hospital. | 13. The White House. | 24. Court House. |
| 3. National Academy of Sciences. | 14. Treasury Building. | 25. Army Medical Museum. |
| 4. Interior Department. | 15. Washington Monument. | 26. Bureau of Fisheries. |
| 5. Lincoln Memorial. | 16. Bureau of Engraving and Printing. | 27. Botanical Garden. |
| 6. Corcoran Art Gallery. | 17. Department of Agriculture. | 28. The Capitol. |
| 7. Continental Hall. | 18. National Museum. | 29. Government Printing Office. |
| 8. Pan-American Union. | 19. Smithsonian Institution. | 30. Post Office. |
| 9. State, War and Navy Building. | 20. Post Office Department. | 31. Union Station. |
| 10. Lafayette Square. | 21. Patent Office. | 32. Senate Office Building. |
| 11. Thomas Circle. | 22. Pension Office. | 33. Library of Congress. |
| | | 34. House Office Building. |

visitors, and out beyond Rock Creek is the great National Zoölogical Park, which in time will become one of the greatest in the world. North of this extends Rock Creek Park, a tract which is preserved in all its natural beauty.

Along the river is Potomac Park, a tract of 737 acres, made up of reclaimed land. The Soldiers' Home, four miles north of the Capitol, is in a beautiful park of 500 acres. To the south of it is McMillan Park, containing

which because of its towering dome is conspicuous from any direction in which one approaches the city. The original plans for the Capitol were drawn by Doctor Thornton, a native of the West Indies, but they were redrawn by Stephen H. Hallet; they were followed in the construction of the first building, which little resembled the Capitol of today. The north wing, which contains the Supreme Court rooms, was finished in 1800, but the opposite wing was not ready until

eleven years later. A wooden passageway then connected them. After the British burned the Capitol in 1814, the new central structure was planned, and the original building was completed in 1827, at a cost of not quite \$2,500,000. In 1851 the building was remodeled, and in 1856 the erection of the present iron dome was begun. The Capitol as it now stands, together with its approaches, has cost about \$26,000,000. The building is 751 feet long and 350 feet in its greatest width, and it covers nearly four acres of ground. Within this imposing building are the two chambers occupied by the Senate and the House of Representatives, rooms for the Supreme Court and apartments for the various committees and officials who meet at the Capitol, and other rooms, made necessary by the great amount of business transacted there. The rotunda, the marble stairways and the dome are decorated with choice statuary and paintings by famous American artists. Most of the paintings depict great events in the nation's history. The famous doors, designed by Randolph Rogers, which guard the east entrance, are ornamented, in high relief, with historic scenes from the life of Columbus. The old Hall of Representatives is now called Statuary Hall, and around its walls are statues of men whose names have become household words in the nation. Most of these statues have been donated by the legislatures of the states to which the men belonged.

To the north, and in a space adjoining the Capitol grounds, is a new, massive granite building, in which are located offices for the Senators, and to the south is another building of white marble, which contains offices for the members of the House of Representatives. These great structures constitute a notable addition to the splendid group of buildings which crown Capitol Hill.

Along the Mall are the buildings of the Fish Commission, the Medical Museum, the great National Museum, the Smithsonian Institution, the Agricultural Department and the Bureau of Engraving and Printing. East of the White House is the low, massive Treasury Department building, while west of it rises the magnificent building of the State, War and Navy Departments. The government Printing Office, the Pension Office and the Interior Department are in different localities of the North West quarter. Near the Capitol, and east of it, is the Library of Congress, one of the most ornate library

buildings in existence. Within the library are housed more than 2,390,000 books and pamphlets and over 500,000 pieces of music, photographs and manuscripts. It is open to the public during library hours, but only members of Congress and a few government officials may take books away from the building.

On May 30, 1922, the Lincoln Memorial, an imposing marble temple, with Doric Columns, was dedicated to the memory of Abraham Lincoln. It is located on the bank of the Potomac, at the western end of the Mall. In the spacious interior is the colossal statue of Lincoln, by Daniel Chester French.

The United States navy yard occupies a large tract of land on the east branch of the Potomac, and the arsenal is on the peninsula where the two rivers join. The old naval observatory was in a park on the Potomac, some distance west of the Executive buildings, but the present observatory is on a reservation north of Georgetown. The government has been generous with its public buildings and institutions. Near the State, War and Navy building is the new building of the Corcoran Art Gallery, a beautiful marble structure, which, with its priceless collection of paintings and statuary, was given to the public by W. W. Corcoran.

Among other interesting edifices are the Pan-American Union building, the Municipal building of the District of Columbia, the Scottish Rite Temple, the Freer Gallery of Art, and the new National Academy of Sciences.

Government, Commerce and Industries. The government of the city, which is that of the District of Columbia, is directly in the hands of Congress, which acts through a board of three commissioners appointed by the President. Washington is peculiarly the capital of the United States, and its life and activities are all controlled by national influences. It is the official residence of the President, the members of the Cabinet, members of both houses of Congress and the host of government employes who work in the various offices and departments. When Congress is in session, the whole city is permeated by its influence, and all its industries are affected. There are few manufactures of any importance, and little commerce is carried on with outside cities. The business is almost entirely a retail trade with the people who live in the city. Naturally, the shifting population

creates a demand for hotels, and they are to be found in great numbers, ranging from the lavish new buildings of the region east of the Executive Mansion to simple, inexpensive hotels and boarding houses, scattered everywhere throughout the city.

Educational Institutions. Washington is a great educational center. It has an excellent public school system, which has the distinction of having been organized in 1800 under a board of trustees of which Thomas Jefferson was the first president.

The leading universities of the capital are Georgetown University, George Washington University, the Catholic University, with its affiliated colleges of the religious orders, and Howard University, an institute for colored youth. On a commanding site near the city are the buildings of the American University established by the Methodist Church.

Supplementing the universities are the great scientific bureaus and institutions for research maintained by the government, such as the Bureau of Fisheries, the Bureau of Standards, the Geological Survey, the Bureau of Labor, the scientific bureaus of the Department of Agriculture, the Bureau of Education, the Army Medical Museum, the National Museum, the Library of Congress and a large number of small libraries connected with various departments of the government.

The Smithsonian Institution, founded by James Smithson, an Englishman, who gave half a million dollars for its establishment, and the more recent Carnegie Institution, with an endowment of \$10,000,000, are the leading private foundations for the advancement of knowledge.

The capital thus affords opportunities for advanced students, especially, in law, medicine, political economy or scientific research, such as are found in few other cities.

History. Washington enjoys the distinction of having been designed and built for the capital of a great nation. Rome, London, Paris and Berlin grew out of the national conditions surrounding them and became the capitals of great empires, but the capital of the United States was located in a region sparsely populated and almost wholly wild; it was built from plans that were created before any city was in existence there. The site was selected by the great President whose name was given the city, and he watched

over its early days with a personal care and interest.

Congress held its first session in the Capitol in 1800. The city grew until 1814, when, after a weak resistance by American troops at Bladensburg, it was captured by the British, who set fire to the public buildings and some private residences, with the expectation of destroying the entire city. A storm put out the conflagration, and the next day the British, in a panic of unnecessary fear, retreated, leaving Washington to be immediately rebuilt. At the breaking out of the Civil War it contained about 61,000 inhabitants. The land through the northwestern part of the city fell into the hands of speculators of acute intelligence, and from time to time Congress was compelled to spend large sums of money in opening streets and beautifying that section of the city. In 1902 new improvements were begun according to a plan designed by Daniel H. Burnham, Charles F. McKim, Frederick Law Olmsted and Augustus Saint Gaudens. Prohibition went into effect in 1917.

Related Articles. Consult the following titles for additional information:

| | |
|----------------------|-----------------|
| Corcoran Art Gallery | National Museum |
| District of Columbia | Potomac |
| Library of Congress | Smithsonian |
| Washington | Institution |
| Monument | White House |
| Mount Vernon | |

WASHINGTON, BOOKER TALIAFERRO (about 1858–1915), an American negro educator. Freed from slavery by the Civil War, he began work in a salt furnace in West Virginia, attended a night school and obtained the rudiments of an education. He then went to Hampton Normal and Agricultural Institute, where he remained three years. After this he took a complete course at Wayland Seminary in Washington, D. C., and then became an instructor at Hampton, in charge of the work of the Indian pupils and of the night school.

His success was phenomenal, and in 1881 he was selected by General Armstrong, principal of the institute, to start a normal school at Tuskegee, Ala. He began his work in an old building, with thirty pupils, but in the course of the year purchased the plantation where the Tuskegee Normal and Industrial Institute is now located. Under his management this school developed into the largest and most influential industrial school for colored people in the world (see TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE).

He wrote *The Future of the American Negro, Up from Slavery* (his autobiography), *Character Building, The Story of My Life* and *Working with the Hands*.



WASHINGTON, GEORGE (1732-1799), an American soldier and statesman, the hero of American independence, and the first President of the nation which he helped to establish. There are two Americans of the generations now past who have won the undying love and reverence of their countrymen—Washington and Lincoln. Though they are equally honored, the one as founder and the other as preserver of the American nation, they are thought of as totally different types. Lincoln, so much nearer our own time, is by far the more human figure. His humanity, his rugged appearance, his humor and his kindness are remembered as the characteristics of a very real man. Washington is more or less of a mythical personage. The idealized portrait painted by Charles Stuart, reproduced here with in full page is in a way symbolic of the impression that Americans cherish of the "Father of His Country." He seems to them a lofty figure somewhat detached from everyday life; a great man, but one aloof from his fellowmen; a strong man, but without fire and vigor. The complete record of his life refutes these ideas. There is every reason to believe that if he were alive to-day he would be a virile and influential figure in American political affairs, a personality as vivid as in his own time.

Ancestry and Youth. The family of the first President came of a line of well-born Englishmen. They were the Washingtons of Sulgrave Manor, in Northamptonshire, who traced their ancestry to a Norman knight of the twelfth century. About the year 1657 John and Lawrence Washington, brothers, emigrated to America, and shortly afterwards purchased estates in Westmoreland County, Virginia. The eldest son of John was Lawrence Washington, the grandfather of the future President. His second son, Augustine, married Mary Ball as his second wife, and the first child of this marriage, George, was born on February 22, 1732, on the family estate

at Bridges Creek, in Westmoreland County. When George was three years old his parents removed to an estate on the Rappahannock River, in Stafford County, and there the boy's first school days were spent. He went to his classes in an old-fashioned school house where the sexton of the parish acted as teacher.

At the age of eleven George lost his father, and his widowed mother sent him to the old homestead at Bridges Creek to live with his half brother, Augustine. There he attended school until he was nearly sixteen, geometry and surveying being included in his studies. While he was not an apt classical student, he made excellent progress in surveying, and throughout this school period he cultivated robust health by outdoor exercise, such as horseback riding and athletic games. It was when he was thirteen that he wrote the rules of good behavior now so well known.

Soon after he left school George went to live with his eldest half brother, Lawrence, who was occupying that portion of the estate known as Mount Vernon. Lawrence Washington had married the daughter of William Fairfax, who was the manager of the great estate of his cousin, Lord Fairfax, the head of the family. Lord Fairfax conceived a great liking for young Washington, and presently entrusted to him the task of marking out the boundaries of the Fairfax estate. George began his duties in 1748, when he was but a few days past sixteen, and for many months he endured the hardships of a surveyor in the wilderness. His work was so well done that he was subsequently appointed public surveyor of Culpeper County, and his surveys were considered admirable examples of thoroughness and accuracy.

In 1751 George accompanied his brother Lawrence on a trip to the West Indies. The journey was undertaken in the hope of restoring the elder brother's health, undermined by service in the British navy. In 1752, a few months after the brothers returned to Virginia, Lawrence died, and George found himself the guardian of his niece and one of the executors of the estate. The death of this niece a few years later made him master of the mansion and the beautiful grounds about it—the Mount Vernon that is to-day a sacred place to all loyal Americans.

Early Military Career. Not long before he died Lawrence Washington had used his influence to have his brother appointed an

adjutant-general over one of the several military districts into which Virginia colony was divided. This division was rendered necessary by the threatened encroachments of the Indians and of the French, who were establishing posts along the Ohio. Washington's eager pursuit of the study of military tactics was interrupted by the trip to the West Indies, but he resumed his duties as adjutant-general after his return, and late in 1753 was requested by Governor Dinwiddie to carry a message of warning to the French forces in the Ohio Valley. It was a hazardous mission for a young man of twenty-one, and the selection reflects favorably upon Washington's reputation for reliability and good judgment. In November, accompanied by an experienced frontiersman, he started on his 600-mile journey. After many narrow escapes from the Indians and the perils of the wilderness, he completed his mission and reported to Governor Dinwiddie on January 16, 1754, at Williamsburg, the capital of Virginia. Shortly afterwards he was appointed lieutenant-colonel of the Virginia regiment.

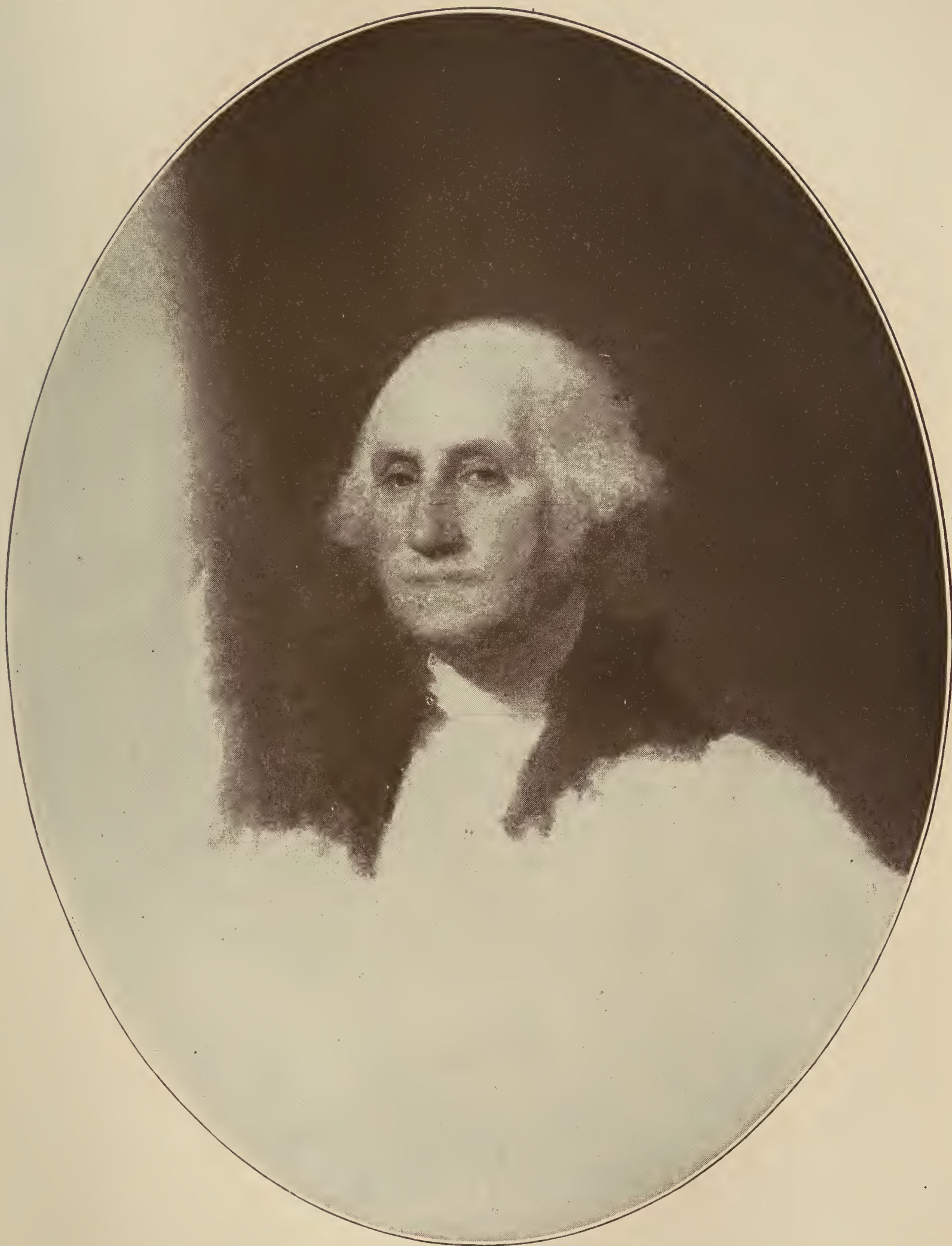
A skirmish with the French in the summer of 1754, which was not decisive, was followed by a reorganization of the Virginia troops and Washington's temporary retirement from things military. Early in 1755, however, General Braddock arrived from England with two regiments of British regulars, and offered the young colonial a place on his staff, with the rank of colonel. Promptly accepting, Washington entered eagerly into the preparation of the campaign, and on July 9 took part in the disastrous fight at Fort Duquesne. How the English regulars were mowed down by bullets fired from behind trees, and how the Virginians under Washington saved the little army from annihilation by fighting under cover, as did the French and Indians, is known to every American school boy. The troops succeeded in withdrawing from the field, but Braddock was fatally wounded, and died four days later. Washington later reorganized the colonial troops and was their chief commander until 1758, when he retired to Mount Vernon to rest. It was with great satisfaction, however, that, in November, 1758, he accompanied the British forces to the smoking ruins of Fort Duquesne, which was renamed Fort Pitt in honor of England's great Prime Minister.

At Mount Vernon. The period between the close of the French and Indian War and the outbreak of the Revolution brought to Washington some of the happiest years of his life. In January, 1759, he married Mrs. Martha Custis, an attractive and wealthy young widow with two children, John and Martha Parke Custis. The management of his own and his wife's property provided an outlet for his business instincts, and he entered whole-heartedly into the public affairs of Virginia colony as a delegate to the House of Burgesses, to which he had been elected before his marriage. These duties, with those of a good churchman and a hospitable colonial gentleman, rounded out a life completely wholesome and happy. The Mount Vernon mansion was always filled to overflowing during the hunting season, but none of its inmates enjoyed the pleasures of the chase more than the master himself.

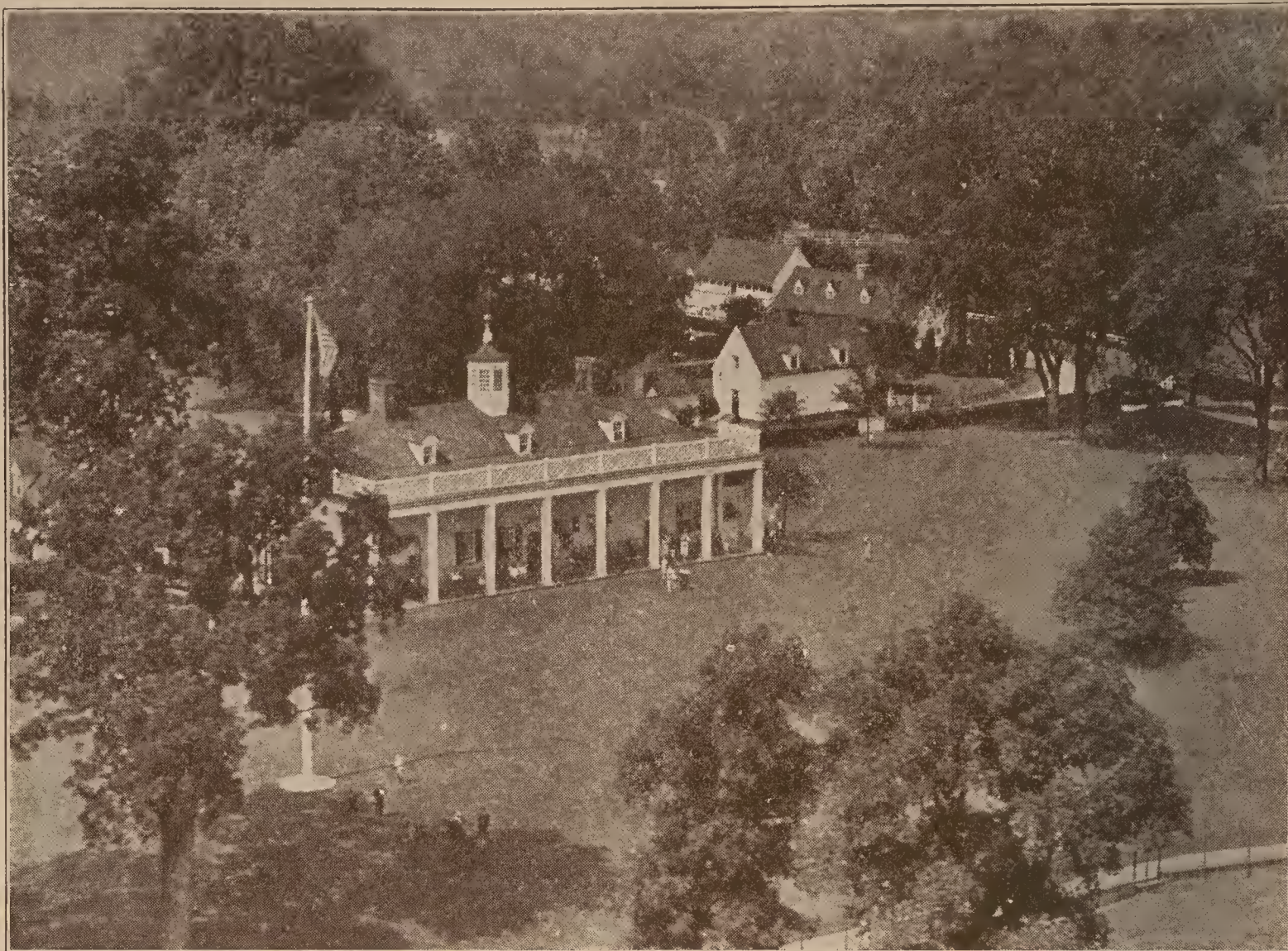
As relations grew strained between the colonies and the mother country, Washington for a long time hoped that an agreement might be reached without resort to war, and he was very guarded in his utterances. In 1769, however, he drew up a nonimportation agreement which was adopted by the House of Burgesses, and from that time on he refused to permit any of the banned articles to be brought into his house.

As a member of the provincial convention, held in August, 1774, at Williamsburg, he vigorously upheld the right of the colonies to govern themselves, and, moved by reports about the effects of the Boston Port Bill, exclaimed in an impassioned speech, "I will raise a thousand men and march with them, at their head, for the relief of Boston." Virginia sent him as one of its six delegates to the First Continental Congress, and in this and the succeeding Congress, held in 1775, he was clearly one of the commanding figures, though he let others make the speeches.

The Revolutionary War. On June 15, 1775, two months after the Battle of Lexington, Washington was unanimously chosen by Congress to be commander in chief of the Continental forces. Addressing the assembly the following day, he modestly accepted the honor, and assured the delegates that he would expect no remuneration except for his own expenses. He then departed on horseback for Boston, and on July 3, 1775, took command of the Continental army, in Cambridge. The old elm under which this cere-



GEORGE WASHINGTON
The unfinished portrait by Gilbert Stuart in the Athenaeum, Boston



MOUNT VERNON

It was Washington's great joy to return to Mount Vernon when the demands of his country permitted. He was a home-loving body. Here on his beautiful estate he "grew stronger, abler, and wiser in the happy years of rest and waiting which intervened" between his great periods of service.



WASHINGTON'S TOMB

mony took place is still preserved as a cherished relic.

The military events of the long struggle which the colonies waged for independence are told in these volumes in the article on the Revolutionary War. The personal share of Washington in the hard-won victory cannot be overestimated; from the perspective of a century and a half it seems almost incredible that he did succeed. Difficulties beset him that would have broken the courage of a weaker man. His little army of barely 14,000 was lacking in arms, supplies, discipline and organization. There was no uniform policy among the colonies on any matters essential to the prosecution of the war, and authority was vested in too many officials and organizations to bring about any semblance of unity. There were bickerings, quarrels and plots. Yet, somehow, Washington overrode all obstacles. For one thing, he was loved and trusted by his men, and because of that trust they endured terrible hardships to uphold him.

When the army went into winter quarters at Valley Forge, in December, 1777, Washington informed Congress that he had 2,898 men unfit for duty because they were "barefooted and otherwise naked." It is a matter of record that blood in the snow marked the path of those unshod troops as they marched into camp.

As a military leader Washington was superior to any of the field commanders sent over by England. In fact, his tactics in the movements on the Delaware River were characterized by Frederick the Great as the "most brilliant achievements recorded in military annals." Years later the old Prussian soldier sent his portrait to Washington, with this message: "From the oldest general in Europe to the greatest general in the world."

Coupled with his genius as a soldier was an abiding faith in the justice and ultimate triumph of the American cause. Toward the close of the struggle a movement was started to have Washington assume the title of king, but his repudiation of such a course was voiced in language as vigorous as he could make it. His great popularity never undermined his modest sense of his own worth or his deep-rooted conviction that the American nation was destined to be a democracy in which kings could have no part.

On November 2, 1783, he took final leave of his faithful army, and the following De-

cember appeared before Congress to resign the commission tendered him over seven years before. He said:

Having now finished the work assigned me, I retire from the great theatre of action, and, bidding an affectionate farewell to this august body, under whose orders I have long acted, I here offer my commission, and take my leave of all employments of public life." "You retire," replied the president of Congress, "from the theatre of action with the blessings of your fellow-citizens; but the glory of your virtues will not terminate with your military command: it will continue to animate remotest ages."

On Christmas Eve Washington arrived at Mount Vernon, where, during the interval before the organization of the government under the Constitution, he enjoyed once more the life of plantation owner and private citizen.

The Constitution and the First Administration. Five years after the signing of the peace treaty a new crisis called Washington again into public life. Under the Articles of Confederation affairs were steadily growing more chaotic, and in May, 1787, a convention was called to meet in Philadelphia to prepare a new form of union. To this body Washington was sent as head of the Virginia delegation; on its organization he was unanimously elected its president. In September the convention completed a new Constitution and gave it to the states for ratification. The influence that Washington exercised in the consummation of this great achievement is ably summarized in Woodrow Wilson's *History of the American People*:

"It gave the convention great dignity that Washington had presided over its counsels and was heart and soul for the adoption of the measures it proposed. His name and quiet force had steadied the convention on many an anxious day when disagreement threatened hopeless breach. His fame and influence infinitely strengthened also the measures proposed, now that they were completed. He supported them because they were thoroughgoing and courageous and cut to the root of the difficulties under which the country was laboring. Issue had been joined now, as he had wished to see it joined, between government or no government, and the country was to know at last where it stood in the most essential matters of its life."

It is not surprising that when the votes of the first Electoral College were counted it was found that Washington was the unanimous choice for President of the United States. John Adams was honored with the Vice-Presidency.

Washington was inaugurated in New York, which was then the national seat of government. Standing on the balcony in front of the old Federal Hall, whose site is now occupied by the imposing Subtreasury, he took the oath of office on April 30, 1789, though the legal day for the ceremony was March 4. Difficulties in setting the new machinery in motion were responsible for the delay.

From the first he displayed in civil affairs the same qualities of leadership and invariable good judgment which he had shown during his military career. He set about informing himself concerning all that had happened during the period of the Confederation—the relations of the new government to foreign nations, and the questions of internal administration and finance, which were soon to become pressing issues. He also chose a remarkably strong Cabinet, including Thomas Jefferson and Alexander Hamilton, who, though directly opposite in their political opinions, were acknowledged leaders in the political life of the country.

The selection of Alexander Hamilton as head of the Treasury Department was momentous in its results, for through his far-seeing statesmanship the country was put on a sound financial basis. In accordance with Hamilton's program the national government assumed the debts of the states incurred during the war; a national bank and a mint were established; and a national income was provided for by duties on imports and a system of internal revenue.

Other important events of the first four years under the Federal Constitution were the organization of the United States Supreme Court, the admission of Vermont (1791) and Kentucky (1792) as states, the adoption of a decimal system of coinage, and the incorporation into the Constitution of the first ten amendments. So profoundly impressed were the people with the results of Washington's first term that there was a spontaneous demand that he serve again. Against his personal wishes he consented, and was unanimously reëlected, being inaugurated in Philadelphia on March 4, 1793. The city of Washington did not become the national capital until 1800.

The Second Term. During this term international affairs for a time overshadowed domestic issues. A war between France and England vastly aroused the sympathies of a group friendly to France, and there were

some extremists who demanded that the nation go to its assistance. Another faction as vehemently urged neutrality or support for England. Washington, who saw clearly that the United States was too weak and insecure to be implicated in European quarrels, issued a proclamation of neutrality and refused to take sides. An unfortunate incident of this affair was the activity of Edmon, or "Citizen," Genet, a Frenchman whose defiance of the proclamation caused the government considerable anxiety. The French sympathizers were also greatly exercised over the acceptance of the Jay Treaty (1794) with England. This treaty was not so favorable to America as its sponsors wished, but it was the best that could be obtained, and it served the purpose of averting war with England, which Washington felt would be a national calamity.

The power of the Federal government was vigorously exercised in this administration. In Pennsylvania in 1794 there occurred an insurrection in protest against the excise tax, to quell which Washington ordered out 15,000 militia. Trouble with the Indians was settled by Anthony Wayne's victory over them at Fallen Timbers in 1794, and by the negotiation of treaties. Other events include the invention of the cotton gin by Eli Whitney; the erection of the first woolen mill in Massachusetts; the admission of Tennessee into the Union, and the development of two great political parties, by followers of Hamilton and Jefferson, respectively.

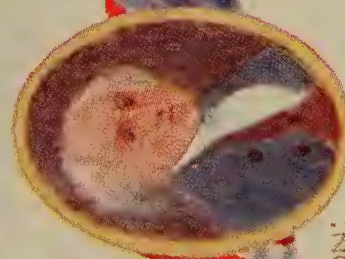
The End of the Story. Washington declined a third election, delivered his famous farewell address and retired to Mount Vernon in 1797. Thereafter he devoted himself to agriculture, though in 1798, at the prospect of the war with France, he was chosen commander in chief of the United States army and accepted, though he was not called into the field. He died in December, 1799, from illness brought on by long exposure in the saddle. The news caused almost as widespread mourning in Europe as in America. The greatest statesmen and soldiers of every nation united in paying him tribute as a man, general, statesman and friend of humanity. The words of his old friend and companion, "Lighthorse Harry" Lee, "First in war, first in peace and first in the hearts of his countrymen," were without question literally true. He had avoided the snares of factional and partisan politics, had generously overlooked

OUR FIRST PRESIDENT

1789-1797



PRESIDENT
WASHINGTON

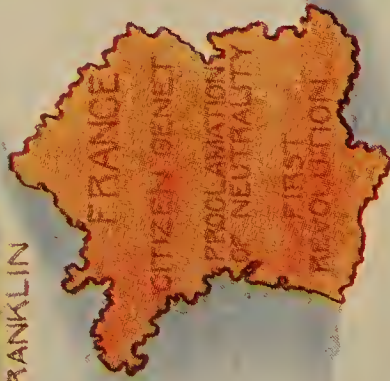


VICE-PRESIDENT
ADAMS

BIOGRAPHICAL SKETCHES:
BIRTH; PARENTAGE; EDUCATION;
MARRIAGE; CHARACTER; PUBLIC
SERVICES; DEATH.



BENJAMIN FRANKLIN
1706
1790



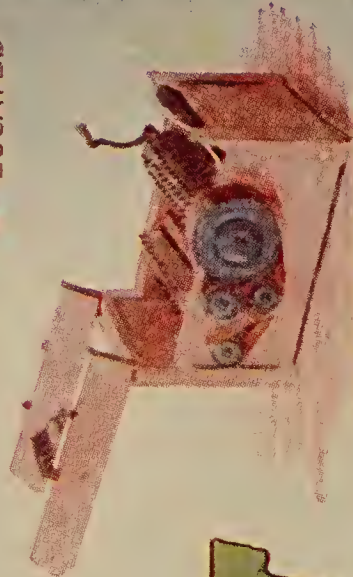
FOREIGN AFFAIRS
FRENCH TROUBLES
CITIZEN GENET
JAY'S TREATY
MISSISSIPPI TREATY
TREATY WITH ALGERIA
GREENVILLE TREATY
ENGLISH ORDER IN COUNCIL



PRESIDENTIAL MANSION, NEW YORK, 1789
A PIER OF THE BROOKLYN BRIDGE
NOW OCCUPIES THE SPOT

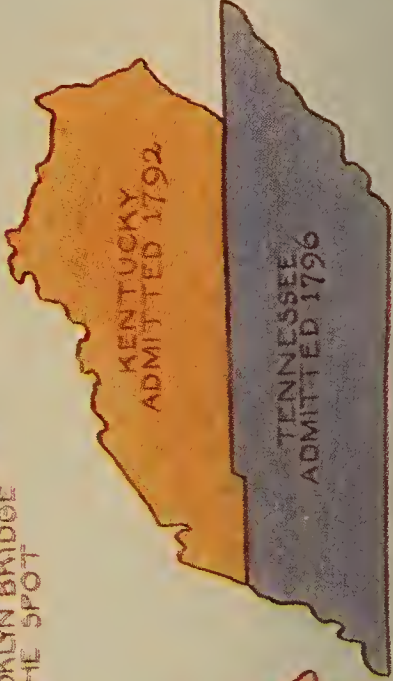


VERMONT
ADMITTED 1791



THE FIRST COTTON GIN

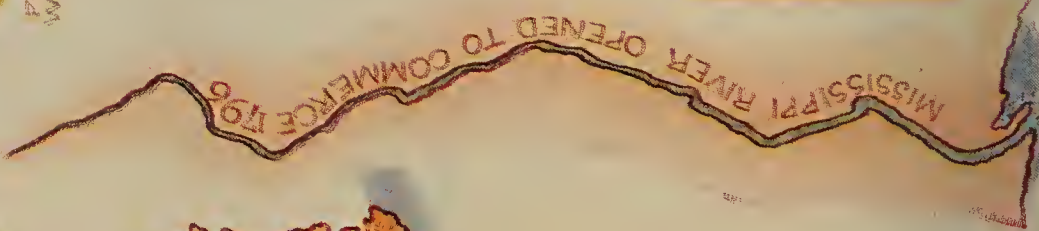
DOMESTIC AFFAIRS
AMENDMENTS
INVENTIONS
NATURALIZATION
CENSUS
TARIFF
SLAVERY
FINANCES
REBELLIONS



KENTUCKY
ADMITTED 1792

TENNESSEE
ADMITTED 1796

PENNSYLVANIA
The Capital State for Ten Years
Events
Indian War
Whisky Rebellion
Discovery of Anthracite Coal
Bank of the United States
Mint Established



OF WASHINGTON IT WAS SAID: "PROVIDENCE LEFT HIM CHILDLESS, THAT HIS COUNTRY MIGHT CALL HIM FATHER."

WHEN THE NATION WAS YOUNG

Administration of George Washington, 1789-1797

- I. ELECTION AND INAUGURATION
- II. THE PRESIDENT
 - (1) Birth
 - (2) Ancestry
 - (3) Education
 - (4) Previous public career
 - (5) Character
 - (6) Rank as a statesman
 - (7) Death
- III. ORGANIZATION OF THE GOVERNMENT
 - (1) Strict and loose constructionists
 - (a) Followers of Hamilton
 - (b) Followers of Jefferson
 - (2) Executive departments
 - (a) State
 - (b) Treasury
 - (c) War
 - (d) Attorney-General
 - (3) Federal courts established, 1789
 - (4) Financial measures
 - (a) The public debt
 - (b) The excise, 1791
 - (c) Bank of the United States
 - (d) The Mint
 - (e) Tariff on imports, 1789
- IV. DOMESTIC AFFAIRS
 - (1) Governmental
 - (a) Last state ratifies the Constitution
 - (b) Census of 1790
 - (c) Whisky Insurrection, 1794
 - (d) Admission of Vermont, Kentucky, Tennessee
 - (e) Site of Washington chosen
 - (f) Ten Amendments
 - (g) Campaigns against the Indians
 - (2) General
 - (a) Invention of cotton gin
 - (b) Death of Franklin
 - (c) Slavery
 - (d) Settlement of Northwest Territory
- V. FOREIGN AFFAIRS
 - (1) Genet and quarrel with France
 - (2) Jay Treaty
 - (3) Treaty with Spain
 - (a) Opened the Mississippi
 - (b) Florida boundary

VI. ELECTION OF 1796

- (1) Political parties
 - (a) Federalists
 - (b) Republicans
- (2) Candidates
 - (a) John Adams
 - (b) Thomas Pinckney
 - (c) Thomas Jefferson
 - (d) Aaron Burr
- (3) Election of Adams

Questions on Washington

Where was Washington at the time of his election to the Presidency?

Where was he inaugurated?

What city was the capital during most of his administration?

How does he rank as a soldier and statesman?

In what way did Hamilton's ideas influence the organization of the government?

What were the original executive departments?

Was the Attorney-General the head of a department?

Who were the members of the first Cabinet?

When were the Federal courts established?

What compromise was necessary before Hamilton could secure the assumption of the state debts?

When was the Bank of the United States organized?

What were some of its powers?

When was the first tariff law passed?

What was its primary object?

When was the first census taken?

What states were admitted during Washington's term of office?

What caused the trouble with the Indians in the Northwest?

What battles were fought and with what result?

What party was friendly to France? Why?

Give an account of Genet's visit to the United States.

What was the Jay Treaty? What did it accomplish?

the harshest criticisms and had respected and used the abilities of his severest critics and opponents. Though a slave-holder at his death, he was in favor of the gradual abolition of slavery by legislation, and by his will he arranged that his one hundred twenty-five slaves should be emancipated at the death of his wife, so that the negroes of the two estates who had intermarried might not be separated. Washington's body and that of his wife, who survived him nearly three years, rest in the family vault at Mount Vernon.

Consult Lodge's *George Washington*, in the *American Statesmen Series*, and Fiske's *Washington and His Country*, a condensed and simplified edition of Washington Irving's *Life of Washington*.

Related Articles. Consult the following titles for additional information:

| | |
|-------------------|----------------------|
| Braddock, Edward | Political Parties in |
| Constitution | the United States |
| French and Indian | Tariff |
| Wars | Revolutionary War |
| Genet, Edmon C. | United States |
| Jay Treaty | Whisky Insurrection |
| Mount Vernon | |

WASHINGTON, MARTHA (1732-1802), the wife of George Washington, born in New Kent County, Va., the daughter of John Dandridge, a wealthy planter. Her first husband, to whom she was married in 1749, was Daniel Parke Custis. She was married to George Washington in 1759. As mistress of the White House she won a firm place in the hearts of the people. She died at Mount Vernon two years and a half after the death of President Washington.

WASHINGTON, PA., the county seat of Washington County, situated thirty-two miles southwest of Pittsburgh, on the Pennsylvania and the Baltimore & Ohio railroads. It is the seat of the Washington and Jefferson College, the oldest college west of the Alleghenies, and also of the Washington Seminary. Notable structures are the Federal building, courthouse, library, sanitarium and hospital buildings. Washington is said to have erected the first community building in the United States. Glass, tubes, tin plate, pottery and baby carriages are the leading manufactures. The place was settled in 1768 and was originally called Bassettown. It received its present name in 1784 and was chartered as a borough in 1852. Population, 1910, 18,778; in 1920, 21,480, a gain of 14 per cent.

WASHINGTON, TREATY OF, the treaty between the United States and Great Britain, signed in 1871, providing for the settlement of several difficulties between the two countries, chief of which were the Alabama

claims. A commission, which consisted of five representatives of Great Britain, headed by Earl de Grey and Sir John MacDonald, and five representatives of the United States, headed by Hamilton Fish and E. R. Hoar, began its meetings May 8 at Washington. It referred the Alabama Claims to a special court, which was to meet at Geneva (see *ALABAMA, THE GENEVA ARBITRATION*). It provided for the establishment of a mixed commission, to discuss and decide upon the northwestern fisheries question, and it submitted the northwest boundary dispute to the arbitration of the emperor of Germany. It also laid down certain rules regarding neutrality in war, which were to govern the Geneva Tribunal in deciding the Alabama question and which have since been considered the true principles of international law upon the subject.

WASHINGTON, UNIVERSITY OF, a coeducational state institution founded at Seattle. It was organized in 1861, but the regular four years' courses were not established until 1877. In 1889 it became the state university, as Washington entered the Union that year. It maintains a college of liberal arts, a college of engineering, a school of forestry, a school of mines, a school of business administration, a library school, colleges of pharmacy and law and a graduate department. The university has a faculty of nearly 200, and a student body of about 4,000. The library contains over 83,800 volumes.

WASHINGTON AND LEE UNIVERSITY, a coeducational institution located at Lexington, Va. It was established as the Augusta Academy in 1749 and afterwards renamed Washington Academy in recognition of a gift of money made to the institution by the "Father of his Country." This gift still yields an annual income of \$3,000. In 1865 General Robert E. Lee was made president of the institution, a position which he held with great influence upon the students for five years. In 1871 the present name of the institution was adopted. The university is divided into schools of commerce, applied science, law and courses leading to the degrees of B.A., B.S., and LL.B. It has a faculty of thirty-five members, about 500 students and property and endowment aggregating \$1,700,000.

WASHINGTON ARCH, a beautiful memorial structure, erected to commemorate the

first inauguration of George Washington as President of the United States. It stands at the foot of Fifth Avenue, New York, and was designed by Stanford White. It is of marble, seventy-seven feet high and sixty-two feet broad, with a single archway forty-seven feet high and thirty feet broad. Its cost of \$128,000 was met by popular subscription.

WASHINGTON ELM, a famous elm, standing near the northwest corner of the Common, in Cambridge, Mass. Near the base is a stone seat with the inscription: "Under this tree Washington took the command of the American Army July 3, 1775." The tree is carefully protected, but is decaying with age.

WASHINGTON MONUMENT, an imposing marble obelisk in Washington, D. C., measuring 550 feet in height. It is the tallest structure in the world, excepting the Eiffel Tower in Paris. It was begun in 1848, but was not dedicated until 1885, on Washington's birthday. The top, from which a magnificent view of the surrounding country is obtained, is reached by an elevator and also by an interior iron stairway. The monument covers an area of 16,000 square feet and cost \$1,187,710.

WASHINGTON UNIVERSITY, a coeducational school at Saint Louis, Mo., founded in 1853 by Dr. William Greenleaf Eliot, on condition that it be kept nonsectarian and nonpartisan. Its activities were carried on in different parts of the city till 1905, when all were removed to the present fine location outside the city limits. Ten new granite buildings on this site were occupied by exhibits and executive offices of the Louisiana Purchase Exposition in 1904. The departments of the university are those of engineering, architecture, law, medicine, dentistry, fine arts and social economy. The faculty numbers 230, and the student registration is about 2,000. The library contains 165,000 volumes.

WASHITA, *wosh'e tah*, **RIVER**, or **OUACHITA RIVER**, a river that rises in the western part of Arkansas, flows southeast and then south into Louisiana and discharges into the Red River, about fifteen miles above the confluence of that stream with the Mississippi. The Washita is connected with the Mississippi by a series of bayous. Its length is 550 miles, and it is navigable for steamboats for about 350 miles.

WASP, *wahsp*, a winged insect resembling the bee in many respects. The body is bluish in color, with yellow markings, or black, marked with white or yellow. Common wasps live in societies, or colonies, composed of males, females and workers, or neuters (see BEE). The females are armed with an extremely powerful and venomous sting; the males do not sting.

The nest of the wasp is ingenious, both in material and construction. It is built in the ground or attached to a wall or tree, and is composed of a kind of chewed wood pulp or paper manufactured by the females. Within these nests the combs are enclosed completely, except for the small opening where the wasps enter. The cells of the comb, in which the larvae and pupae are reared, are six-sided and arranged in tiers, with the mouth downward or sidewise.

Wasp colonies multiply rapidly, and have been known to attain to 30,000 members in a favorable summer season. But in the fall all the members perish except a few females, which pass the winter under stones or in hollow trees. Wasps are voracious insects, living upon sugar, meat, fruit, honey or the juices of other insects. Certain species live solitary lives, each mother making its own nest and caring for its own eggs and larvae.

WATAUGA ASSOCIATION, in American history a name given to an association of settlers, formed in 1772, in the eastern part of what is now Tennessee, just west of the Alleghany Mountains. Articles were drawn up for the purpose of creating a government for the district, and provision was made for five executive councilors, thirteen legislators, a sheriff and an attorney. The government had no jurisdiction over any but the signers of the compact, and the territory soon swarmed with outlaws and adventurers. In order to secure protection, the community, under the name of Washington District, asked for and secured representation in the North Carolina Assembly.

WATCH, a small, portable mechanism for measuring time, having about the same number of wheels as a clock, geared in the same manner, but differing from a clock in having a hairspring and a balance wheel, instead of a pendulum, and in having its parts much smaller and more delicately adjusted. It is attached to a chain and carried in the pocket, or to a bracelet and worn on the wrist.

Mechanism. A watch consists of two parts, the case and the works. The case is of metal, usually gold or silver, and it is made with one or two covers. The works consist of two plates, perforated for the purpose of holding the wheels in position, and so arranged that they contain, between them, all of the wheels except the balance wheel. The lower plate, known as the pillar plate, rests next to the dial. The upper plate may be in one or in several pieces, but in the best-made watches it is usually in one piece. These plates are bored and chiseled so that each wheel fits perfectly into its place. The perforations, in which the minute axles of the wheels rest, are usually set in jewels, which prevent wear. There are four wheels in the watch; these are (1) the barrel wheel, within which the mainspring is attached, (2) the first wheel, (3) the second wheel and (4) the third wheel, which is attached to the pinion of the escapement wheel. The motion is imparted by the uncoiling of the spring and is regulated by the escapement, which is kept in operation by the action of the mainspring and the hairspring combined, the two giving it an oscillating movement. The wheel which meshes into the pinion of the escapement wheel revolves once a minute and has sixty teeth upon its circumference. The pinion of this wheel meshes into the circumference of the wheel which gives the motion to the minute hand, and this meshes into the pinion of the center wheel, which gives the motion to the hour hand. The watch is regulated by a lever device, connected with the hairspring. By moving this to the right, or left, the tension is lessened or strengthened.

Watch Making. The works of a watch have for their foundation two plates of an alloy of brass and nickel. These plates are cut at the foundry, where the metal is cast, from dies furnished by the watch factory.

The rough plates are passed under trimming, or stripping, punches, which smooth off the roughness. Indentations absolutely exact are then made in the foundation plate, to allow room for the wheels. The plate is placed under the lathe portion of a machine, and a steel copy of what it is to be is fastened to another part. The machine follows the outline of the steel model, gradually cutting out the foundation plate, so that the various parts of the mechanism of the watch will be thrown into proper position. The

thickness of the plate and the depth of the indentations are measured so as to be perfect, according to a gauge, two degrees of which equal the thousandth part of an inch. The necessary screw holes and apertures for the settings are then drilled into the plate. The work on the upper plate is done in the same manner. The plates are then polished and smoothed down, on an Ayr stone, a stone harder than a soapstone and softer than emery, capable of polishing without scratching.

The jewels used in watch making are garnets, rubies, sapphires and diamonds. Garnets are most common and are cut with diamond points into minute disks and then smoothed and pierced. These disks are set in larger disks of gold. The foundation plates are given an ordinary heavy plating of gold, by the battery process, and the jewels with their settings are fitted and fastened into the plate by exceedingly small screws.

The wheels of a watch are stamped out of sheets of brass, with the exception of one or two pieces. The screws and springs are made from sheet steel, the screws being cold-drawn from wire. In tempering some of the screws, the workman uses a thermometer of a peculiar sort, in order to regulate accurately the temperature to which they are to be heated and cooled. Others are regulated by a careful observation of their color. The figures are printed on the dial by a process resembling lithography (see LITHOGRAPHY). The base of the dial is of copper and is stamped out of a thin sheet of the metal, in such a manner that a rim is left turned up for a short distance all around. Powdered enamel is spread on the disk, and it is then fired, like pottery or china. Steel plates are engraved with the design to be executed, and the lines are filled with a mineral paint of the desired color. The plate is then passed under a roller, covered with sheet rubber, and the dial receives the impression from the rubber on the roller. It is again fired, and when fancy colors are employed, each color requires a separate impression and firing. The balance wheel requires forty different steps in its manufacture.

When all the parts are assembled, the watch is taken to a refrigerator and subjected to cold. This is followed by a period in a hot air compartment, the two tests ranging from 40° to 103° F. The making of

watches by hand is thought to have originated in Germany about 1500. Since the advent of the machine-made watch, the United States has reached the foremost position as a watch-manufacturing country. The largest watch factory in the world is at Waltham, Mass., and another, nearly as large, is located at Elgin, Ill. See CLOCK.

WATER, the liquid that covers five-sevenths of the earth and is essential to all animal and vegetable life, is a chemical compound of hydrogen and oxygen in proportion of two atoms of the former to one of the latter. Its chemical symbol, therefore, is H_2O . Pure water is a colorless, tasteless, odorless liquid. It appears blue, like the atmosphere, when seen in mass.

Three Forms of Water. Water takes three forms, each depending upon temperature. It takes a solid form, that of ice or snow, at 32° Fahrenheit (0° Centigrade) and all lower temperatures; and it takes the form of vapor or steam at 212° F. (100° C.) under a pressure of 29.9 inches of mercury, and it retains that form at all higher temperatures. Under ordinary conditions, water possesses the liquid form only at temperatures lying between 32° and 212° . It is, however, possible to cool water very considerably below 32° F. and yet maintain it in the liquid form. Water may also be heated, under pressure in the laboratory, many degrees above 212° F., without passing into the state of steam.

The specific gravity of water is 1 at 39.2° F., (that is, one cubic centimeter of water weighs one gram), and it is the unit to which the specific gravities of all solids and liquids are referred, as a convenient standard; one cubic inch of water, at 62° F. and 29.9 inches barometrical pressure, weighs 252.458 grains. Distilled water is 815 times heavier than atmospheric air. Water is at its greatest density at 39.2° F. (4° C.), and in this respect it presents a singular exception to the general law of expansion by heat. If water at 39.2° F. be cooled, it expands as it cools, till reduced to 32° , when it solidifies; and if water at 39.2° F. be heated, it expands as the temperature increases, in accordance with the general law. Were it not for this peculiar property of water, ice would settle to the bottom of lakes and streams and they would become masses of solid ice, a condition which would soon destroy all life upon the earth.

Water as a Solvent. From a chemical point of view, water is a neutral fluid and shows in itself neither acid nor basic properties; but it combines with both acids and bases, forming *hydrates*, and with neutral salts. Water also enters, as a liquid, into physical combination with the greater number of all known substances. Of all liquids, water is the most powerful and general solvent, and on this important property its use depends. In consequence of the great solvent power of water, it is never found pure in nature. Even in rain water, which is the purest, there are always traces of carbonic acid, ammonia and sea salt. Where the rain water has filtered through rocks and soils and reappears as spring or river water, it is always more or less charged with salts derived from the earth, such as sea salts, gypsum and chalk. When the proportion of these is small, the water is called *soft*; when larger, it is called *hard water*. The former dissolves soap better and is therefore preferred for washing; the latter is often pleasanter to drink. Some springs contain a considerable quantity of foreign ingredients, which impart to the water particular properties. The only way to obtain perfectly pure water is to distill it, but matter simply held in suspension may be taken out by suitable filtration.

Sources of Water. The great reservoirs of water on the globe are the seas and lakes, which cover more than three-fifths of its surface, and from which water is raised by evaporation. Uniting with the air in the state of vapor, it is wafted over the earth, ready to be precipitated in the form of rain, snow or hail. Water, like air, is absolutely necessary to life, and healthy human life requires that it should be free from contamination; hence, an ample and pure water supply is considered as one of the first laws of sanitation.

Related Articles. Consult the following titles for additional information:

| | | |
|---------------|----------------|--------------------|
| Boiling Point | Frost | River |
| Chemistry | Hail | Snow |
| Cloud | Humidity | Spring |
| Dew | Hydrogen | Steam |
| Distillation | Ice | Vapor |
| Erosion | Mineral Waters | Water Power |
| Evaporation | Ocean | Water Purification |
| Freezing | Rain | |

WATER, ORDEAL BY. See ORDEAL.

WATER BEETLE, any representative of several families of beetles which live in or upon the water. Three of the families include

beetles which live permanently in water; the rest include those species which live in the water only in the larvae (young) stage.

The *diving beetle* has a flat, oval body, over which the wings fit tight. The hind legs, which have a fringe of hairs, are flattened and adapted to swimming; the front legs are short. The common *water beetle* seen in summer darting over the surface of ponds has a water-tight compartment beneath the close-fitting wings for the storage of breathing air. In the evening these beetles leave the water and fly about. The larvae, called *water tigers*, are exceedingly rapacious, seizing in their sickle-like jaws small fish, tadpoles and other larvae, from which they suck the juices. Breathing is effected through tubes terminating in the tail, which is raised above the surface of the water.

The *whirligig beetles*, so called from their habit of moving in circles on the water, have long, clawed front legs and shorter, paddle-shaped hind legs. The body has an oily surface unaffected by water, and the compound eyes are adapted for vision in water and in air. One of the largest of the water beetles is the glossy *black beetle*, often seen on the wing at night. These insects can be transferred to an indoor aquarium, and their whole interesting life history may be studied in the school room. See BEETLE.

WATER BUG, a name applied to any insect belonging to one of six large families, including *water striders*, *water boatmen*, *water scorpions*, *toad bugs* and *fishkillers*. All have flat bodies, and are equipped with oar-shaped legs for swimming. They may be seen on summer days darting over the surface of ponds and lagoons or resting quietly on the surface, their bodies being buoyed up by the air stored in various parts of the insects. If alarmed, they may dive to the bottom and cling to plants or stones. About a dozen species are found in America. Some of them leave the water and fly around lights at night; the electric light bug is one of these. Some of the adults lie dormant in the mud of water bottoms in winter; others hibernate in rubbish on the banks, and here the eggs are deposited. When the young hatch they tumble into the water and feed on insects and other small animal food. The females of some species bore holes in aquatic plants and deposit their eggs there. In the United States the *croton bug*, a house pest resembling the cockroach, is incorrectly called

water bug, because it is usually seen on or near warm-water pipes.

WATERBURY, CONN., one of the county seats of New Haven County, thirty miles southwest of Hartford, on the Naugatuck River and on the New York, New Haven & Hartford Railroad. It is an important manufacturing center, leading the United States in brass and copper goods and for this reason sometimes known as the "Brass City." The famous Waterbury watches have been manufactured here in immense numbers since 1879. There are also button factories, foundries, machine shops, knitting mills, clock factories, bottling works, publishing houses and engraving establishments.

Among the educational institutions are Saint Margaret's School for girls, Convent of Notre Dame, Gerard School, two business colleges and a public high school. Other important features are the Bronson Public Library, Waterbury Hospital, St. Mary's Hospital, Southmayd Home for old ladies, the city hall and the Masonic Temple. The place was settled in 1677 and was known by the Indian name of Mattatuck until its incorporation as a town, in 1686. It was chartered as a city in 1853. In 1691 it suffered from a flood; in 1712 an epidemic proved fatal to about one-tenth of the population, and in 1902 a large portion of the business section was destroyed by fire. The town and city of Waterbury were consolidated in 1900 and cover an area of twenty-eight square miles. Population, 1910, 73,141; in 1920, 91,410.

WATER COLORS, pigments mixed and ground with gum size or some other adhesive substance, instead of oil. The water colors used in painting pictures are in the form of small, dry and hard cakes, while those used in coloring walls and the like are simply mixed up with glue or size. The quick drying of water colors is favorable to rapid execution, and a greater clearness and transparency is obtained than in an oil painting.

WATER DOG. See MUD PUPPY.

WATERFALL. See CATARACT.

WATER LILY, a water plant with a gorgeous blossom, found in quiet waters of the temperate and torrid zones. From the oozy bottom the stems rise to the top of the water; there the leaves open out and lie flat upon the surface, and the buds unfold, disclosing numerous petals, stamens and carpels. The flowers may be pink, white or blue, and

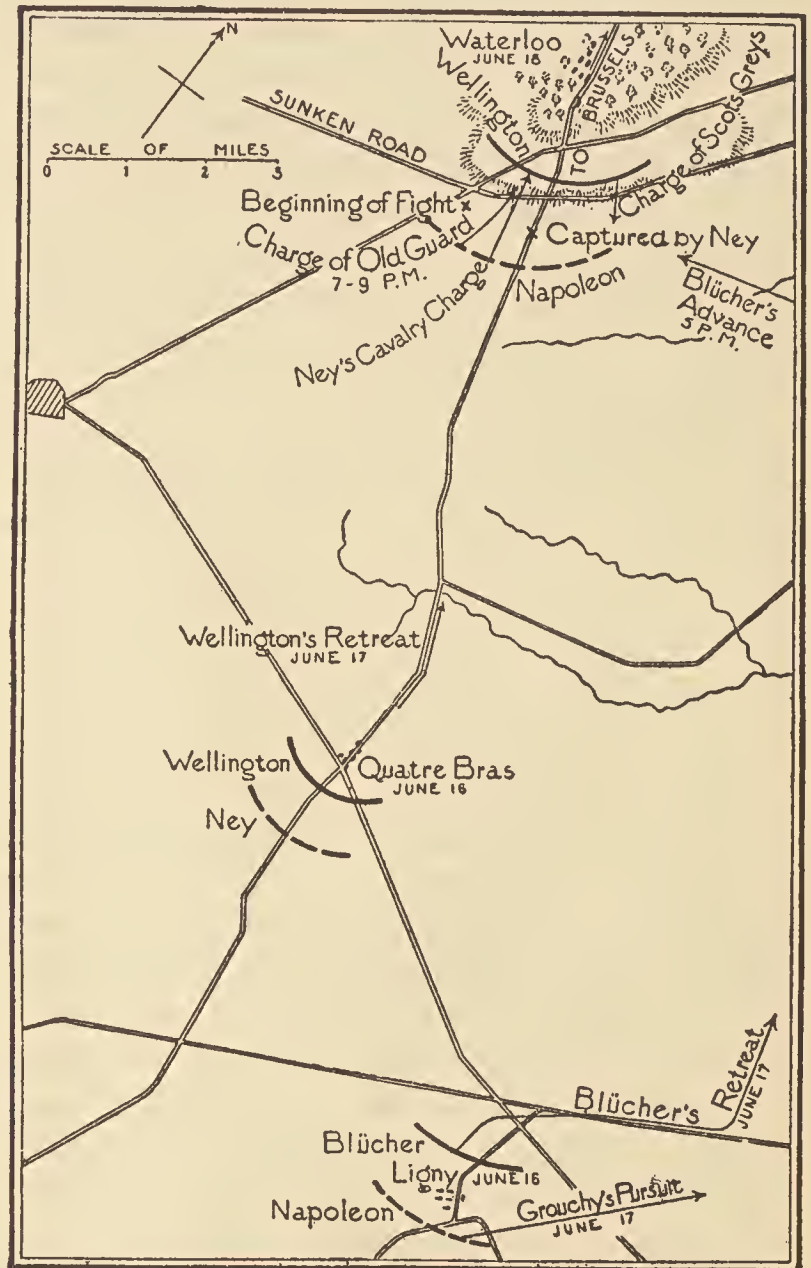
sometimes they are very fragrant. The most famous of water lilies is the Queen Victoria, a native of South America. The leaves, six feet or more in diameter, are flat, with upturned rim, and are often strong enough to support a man's weight. The blossoms, a foot in diameter, open on two successive nights; the first night they are white and fragrant, the second, pink and malodorous.

The Australian water lily is often as large and is usually blue. The Egyptian lotus is also a blue lily, famous since remote antiquity. The American pond lily is a lovely, creamy-white flower, with petals radiating in circles and a cluster of golden stamens. It expands to the sunshine and closes at dusk. The golden lily of Florida is a handsome flower, and the common yellow water lily of higher latitudes is less showy, but blooms all summer. A rose-colored variety is also found in North America. The seeds of the pond lily lie sunk in pits in the flattened top of a hemispherical pod. Those of several species are edible, and are sometimes called *water chinquapin*. They were an important article of food among the Indians.

WATERLOO, BATTLE OF, the famous battle, fought June 18, 1815, near Waterloo, a village in Belgium about eleven miles south of Brussels, between Napoleon and the allied forces under Blücher and Wellington. It was Napoleon's last battle, and it put an end to his power (see HUNDRED DAYS). There had been two preliminary battles on the 16th, one at Quatre-Bras, by which Ney, although forced to retire, prevented Wellington from joining his Prussian allies, and one at Ligny, in which the Prussians under Blücher were defeated by Napoleon. On the morning of the eighteenth the main French army was drawn up near Waterloo, opposite the allied British, Dutch and German forces, under Wellington. Blücher, with the Prussian army, was absent at the opening of the fight. The French army numbered about 72,000, the allied army about 67,000, of which number many were untrained troops.

Napoleon's plan was to defeat Wellington before Blücher could come up with his troops, but the ground was in such a condition from the rain that had fallen all night that he was obliged to delay opening battle until almost noon. Wellington, on the contrary, simply aimed to hold out until the Prussians arrived, when a combined attack might be made on

the French. In accordance with these plans the struggle throughout the day consisted chiefly of charges, brilliant but unsuccessful, on the part of the French, and firm resistance on the part of the English. The French



BATTLE OF WATERLOO

cavalry, charging during the afternoon, plunged into an unseen sunken road, and unable to check their rush, they filled the great ditch with troopers, over whom the remainder rode on. These repeated charges, although stubbornly resisted, had their effect, and the outcome of the battle remained doubtful until late in the day, when the arrival of the Prussians, at a time when both armies were about exhausted completely turned the tide against the French. Napoleon's last effort was the charge of the Old Guard, the picked veterans from the Imperial Guard, late in the evening. Its rout was complete, and many of its squares, refusing to surrender or retreat, fell to the last man. Wellington now gave the order for a general advance, and the French, utterly overpowered, gave way at every point. The army broke up in confusion, and the dis-

astrous retreat, with the Prussians in pursuit, lasted through the night. Napoleon himself escaped by flight. The French lost in this battle probably thirty-one thousand in killed, wounded and missing, while the allies lost over twenty-two thousand.

The importance of the Battle of Waterloo as the means of finally crushing Napoleon has been somewhat exaggerated. Even had he been successful on that day, he could never have regained his old power. But the accomplishment of his overthrow that early in his campaign was fortunate for the allies and for the French, as it saved further bloodshed. See NAPOLEON I.

WATERLOO', IOWA, the county seat of Black Hawk County, on the Red Cedar River and on the Chicago, Rock Island & Pacific, the Illinois Central, the Chicago Great Western, and the Waterloo, Cedar Falls & Northern railroads. Since 1900, Waterloo has been one of the most rapidly growing cities in the state. It is known as the "Factory City;" it manufactures about twenty per cent of all the United States-made gasoline engines of the farm type. There are also foundries, malleable iron works, concrete works, machine shops, farm implement factories, packing houses, canneries and cream separator factories. The principal structures are a Federal building, a courthouse, municipal buildings, two Carnegie Libraries, Presbyterian and Serphic Heights hospitals, the Russell-Lamson Hotel, and several imposing bank buildings and business blocks. Our Lady of Victory Academy and two business colleges are located here. The city was settled about 1845, and was incorporated in 1868. Population, 1910, 26,693; in 1920, 36,230, a gain of 36 per cent.

WATERLOO, ONT., on the Canadian National Ry., three miles northwest of Berlin. It is an important center for manufacturing, furniture, boots and shoes, threshing machines, buttons, mattresses, washing machines, trunks and bags, bricks and tiles being the most important products. Niagara electric power is furnished to the factories. There are good public and separate schools and six churches. Population, 1921, 5,883.

WATERMELON, a creeping variety of gourd. The rind of the fruit is smooth and dark green when ripe; the inside of the melon is a coarse red or yellowish pulp, ninety per cent of which is water. Its native home was Africa, but it has been widely cul-

tivated from remote times. It is very popular in the United States, where it has become a most important crop for the fruit-growers of the South Atlantic and Gulf states, in which sections thousands of acres are devoted to raising melons for the northern market. Watermelons in smaller quantities are raised as far north as Southern Ontario. The ideal soil for melon culture is light, sandy loam, which is naturally dry or else thoroughly drained. Most melons weigh from twenty to fifty pounds.

WATER PLANTS. See AQUATIC PLANTS.

WATER POLO, a ball game similar to hockey, played by swimmers, with a ball filled with air, which floats. It is a good game for swimming tanks, and is then played generally throughout the winter season. The object of the game, of course, is for one side to carry, push or throw the ball to the opponent's goal line, at the end of the tank.

WATER POWER. By far the larger part of the machinery in the world is operated, directly or indirectly, by water power. Many of the great factories, mills and electric plants are located on or near rapid streams, because water power is much less expensive than steam power. The installment of a water-power plant usually requires the construction of a dam, a canal or flume to conduct the water to the wheel, and a power house. The original expense may be greater than that of a steam plant, but the extra expense is soon recovered by the saving in operating expenses, for when properly installed, the water-power plant will run for years with only slight repairs, and without fuel cost.

Classification. Water-power plants are divided into three classes—*low-head*, *medium-head*, and *high-head*, according to the height of the fall. Low-head plants have a fall not exceeding 100 feet; medium-head, not exceeding 350 feet, and the high-head class includes all plants having a fall of more than 350 feet. The fall of some plants in this class exceeds 5,000 feet. Most of the great plants are of low-head type, and they are located on the banks of large streams. They gain in volume what they lose in fall. The largest plant of this type in the world (1919) is at Keokuk, Iowa (see KEOKUK). The most noted plant of the medium-head type is at Niagara Falls, where over 300,000 horse power has been developed.

Plants of the high-head type are usually found on mountain streams having a rapid flow and small volume of water. A dam is constructed across a deep, narrow valley to impound the water, which is conducted to the power house through steel pipes. The power house may be two or three miles below the dam, so a high fall is secured. These plants are operated by a small volume of water under very high pressure and they require a special type of water wheel (see **TURBINE WHEEL**). Their principal use is in generating electric power, which is often carried long distances over wires. The power used in operating the street cars in San Francisco, for instance, is generated over 125 miles from the city.

Estimating Water Power. The power of water for operating machinery is derived from its weight or pressure. The pressure of a column of water of a given height is equal to the weight of the water. A cubic foot of water weighs 62.5 pounds; therefore a column of water one foot square and ten feet high weighs 625 pounds, and at its base exerts a pressure on a square foot equal to that weight. The rule for estimating the horse power of a water fall is as follows: Multiply the flow in cubic feet per second by the height of the fall and this product by .1134. A fall of 100 feet and 600 cubic feet flow will have a power equal to $100 \times 600 \times .1134$, or 6,804 horse power.

Government Ownership. In the United States all water power on government land is under control of the government, and since the beginning of the present century stringent laws for preventing great power sites from falling into the hands of monopolists have been passed. Unfortunately, however, before the conservation movement was started, many valuable sites had been appropriated by capitalists and a legal claim to them had been established. Since water, like air, is one of the great natural resources of a country, the theory of the most enlightened governments is that it belongs to all the people; therefore all water power should be under control of the government, and it should be leased, not sold. Canada is far ahead of the United States in this respect, for in Canada all water power is under government control. Power sites may be leased, but none can be purchased.

It is estimated that the total water power of the United States is 30,000,000 horse

power, and that less than one-sixth of it has been developed. The water power of Canada is estimated at 18,000,000 horse power, only about eight per cent of which has been developed. Europe has 41,000,000 horse power, and utilizes only one-tenth of it. The water power of the other continents is not known.

WATERPROOFING, a process of rendering cloth and other articles proof against water. In the preparation of mackintoshes a solution of rubber is spread on the goods, and the cloth is doubled, pressed and finished with the waterproof layer in the middle. Such goods are impervious both to air and to water, but from a sanitary point of view they are not desirable for constant wear. A new process has been introduced, which renders the fabrics proof against water, but does not obstruct ventilation. The materials are saturated with soap and then dipped in an alum solution. Still another process, by which the same result is obtained, consists of treating the fibers of the cloth, instead of the manufactured, woven fabric, with the solution. Paraffin is often used as a substitute for rubber in waterproofing leather, wood and various other substances. Paper is made waterproof by immersing it in a solution of shellac in borax, a treatment which causes it to resemble parchment paper.

WATER PURIFICATION. Pure water is essential to health, and often one of the most perplexing problems connected with water supply is that of securing pure water. Because of its solvent power, all water obtained from natural sources contains more or less impurities, some of which may be highly injurious. Among the mineral impurities held in solution are usually found lime, iron, compounds of sulphur and sometimes compounds of lead. The impurities not held in solution are clay, particles of soil, animal and vegetable matter and bacteria.

Lime and sulphur are not injurious to health; neither is iron, unless it occurs in excess. The presence of clay, sand and organic matter makes the water turbid, and the organic matter renders the water dangerous to health. All these substances should be removed.

The processes employed for purifying water on a large scale include settling or sedimentation, filtering and chemical treatment. Settling is secured by allowing the water to remain quietly in large tanks, from

which it flows slowly from the top. Where the water contains a large quantity of solid matter two or three settling tanks may be necessary, but usually one is sufficient. The sand and gravel of the earth form a natural filter for spring water, and this sort of filter is used in water purification. The filters consist of large tanks with perforated bottoms, over which layers of gravel and sand are placed. As the water percolates through these layers the solid matter and most of the bacteria are removed. If the water contains a large proportion of lime, it may be treated with a solution of sulphate of alumina. The lime separates this compound into alumina and sulphuric acid. The acid unites with the lime or magnesia in the water and renders it harmless, and the alumina coagulates the organic matter and carries it to the bottom of the tank.

Home Tests. Epidemics of typhoid, diphtheria and other contagious diseases are often traced to impure water. Because water is clear, it does not follow that it is pure. A glass of the most sparkling water imaginable may contain millions of death-dealing germs, and every household should know of simple means of testing water whose purity is suspected. The following tests can be applied by any one at practically no expense:

(1) Into a vial containing about two ounces of water put a quantity of granulated sugar equal in volume to a pea or small bean. When the sugar is dissolved, cork the vial and set it in a warm place for forty-eight hours. If, when the cork is removed, the water emits a disagreeable odor, it is unsafe.

(2) Make a solution of permanganate of potash by dropping into an ounce of water a few crystals of this substance, which can be obtained at any drug store. Into a glass of the suspected water place a few drops of the solution. If the purple color disappears, the water is unsafe.

These tests are satisfactory within certain limits, but all water suspected of pollution should be tested by a chemist; any householder may have this done free of charge by sending a sample of the water to the State Department of Public Health or to the state university. Water for household purposes should not be run through lead pipes, for it may attack the lead and form compounds that are exceedingly poisonous. See LEAD POISONING.

WATERSHED, an elevation of land which separates the headwaters of natural drainage systems. Such a configuration of land is

sometimes called a *divide*. A watershed separating great river systems may be only a slight rise of ground, such as the divide between the waters flowing into Hudson Bay on the north and the Gulf of Mexico or the Atlantic on the south and east. Again it may be a range of lofty mountains, such as the Rockies, which separate the headwaters of streams flowing respectively into the Mississippi and the Pacific.

WATERSPOUT, a whirling column of water, extending from a cloud to the surface of a body of water, like the ocean or a lake. The presence of this column is marked by the cloud of vapor which it contains. This cloud is formed by the rapid condensation of the moisture in the atmosphere, due to expansion and rapid cooling, caused by the low pressure in the area occupied by the column. If the conditions continue a sufficient length of time, rain is produced and sometimes falls in such quantities as to constitute a small deluge. In waterspouts over the ocean, the lower part of the column may contain vapor from salt water, but usually the vapor is that of fresh water. Waterspouts are caused in the same way as whirlwinds. See WHIRLWIND.

WATERTOWN, N. Y., the county seat of Jefferson County, seventy-three miles northeast of Syracuse, on the Black River and on the New York Central Railroad. The city is the center of one of the most productive dairying regions of the country, doing an annual business in cheese alone of \$1,500,000. There are also extensive deposits of iron and limestone in the vicinity. The river furnishes extensive water power, and there are large paper and pulp mills, foundries, machine shops, silk mills and other establishments. The principal buildings include a Federal Building, a Masonic Temple, a Y. M. C. A., the Flower Memorial Library, a courthouse and an armory. The city has two hospitals, two orphanages and a home for the aged. Watertown was settled in 1800, was made the county seat in 1805, and was chartered as a city in 1869. It adopted the commission form of government in 1918. Population, 1910, 26,730; in 1920, 31,263, a gain of 17 per cent.

WATERTOWN, S. D., the county seat of Coddington County, 214 miles west of Minneapolis, on the Big Sioux River and on the Chicago & North Western, the Chicago, Rock Island & Pacific, the Great Northern and

the Minneapolis & Saint Louis railroads. It is about three miles from Lake Kampeska, a resort for camping and fishing. Watertown is an important shipping point for grain and stock. There are large grain elevators, warehouses and flouring mills. Leather goods, agricultural implements, carriages and wagons, foundry and machine shop products are manufactured. The city has a Carnegie Library and two hospitals. It is under the commission form of government. Population, 1920, 9,400.

WATERVILLE, MAINE, a city in Kennebec County, seventeen miles northeast of Augusta, on the Kennebec River and on the Maine Central Railroad. Colby College, Coburn Classical Institute, the Ursuline Academy and a Carnegie Library are notable institutions and buildings. The principal industrial establishments are run by water power from the river and include cotton mills, woolen mills, railroad shops and furniture and carriage factories. The first settlement was made here about 1760, but it remained a part of Winslow until 1802. The city was chartered in 1888. Population, 1910, 11,458; in 1920, 13,351.

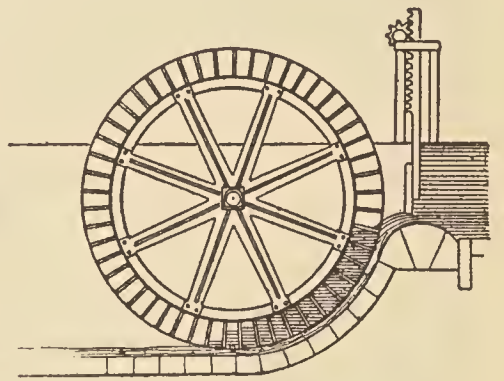
WATERVLIET, *waw tur vleet'*, N. Y., a city in Albany County, on the Hudson River, opposite Troy, near the terminals of the Erie and Champlain canals, and on the Delaware & Hudson railroad. A United States arsenal was established here in 1807 on a reservation of 109 acres, and has since been one of the largest permanent centers in the country for the manufacture of war materials. Other manufactures include woolen goods and iron and lumber products. The place was originally called West Troy. It was incorporated as a village in 1836 and as a city in 1897. Population, 1910, 15,074; in 1920, 16,073, a gain of 7 per cent.

WATER WHEEL, a wheel constructed and set up for operating machinery by water power.

The old style water wheels were large wooden structures, rotating upon a horizontal axis. They were constructed of two frames, from

four to six feet apart, joined at their circumferences, with buckets or floats attached, as occasion required. They were known as *overshot or undershot* wheels, according to the method of operating, the overshot wheel receiving water at the top, and the undershot at the bottom. Each of these is described under its respective title. The *breast* wheel has the water admitted to the floats at a point horizontally opposite the axle.

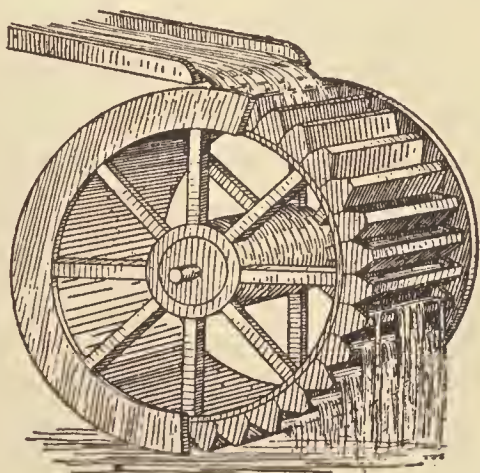
A recent modification of the undershot wheel consists of a small iron wheel, with cups or buckets upon its circumference the whole enclosed in an iron box. This is often known as the *impact wheel* or, *water motor*. The water issues from a small nozzle under very high pressure, and as it strikes the box it causes the wheel to revolve with great rapidity. These wheels are convenient, because of their small size and the ease with which they can be placed in almost any desired position, but they are of use only in cities where the waterworks enable a high pressure to be obtained. Another form of wheel in common use is the turbine. See **TURBINE WHEEL**.



BREAST WHEEL

WATERWORKS, the system of reservoirs, pumps and mains arranged for supplying a community with water for domestic use, manufacturing purposes, fire protection and street and lawn sprinkling. The water supply of large cities is usually conducted from near-by lakes or rivers; small towns obtain their supply from springs or wells. The selection of a source of supply must be made with great care, in order that it may be free from decaying animal and vegetable matter and other organic impurities. It must also be free from sewage contamination. Cool water is considered better than warm, because it is less hospitable to the propagation of life.

Where the source of supply is a long distance from the city, a reservoir is usually constructed, which is connected with the city by an aqueduct emptying into one or more smaller reservoirs, as in the New York City plant. From these reservoirs the water is distributed through mains to different



OVERSHOT WHEEL

portions of the city, and from the mains to consumers. When situated near a suitable source of supply, the water is pumped directly through the mains, as is the case in Chicago, which secures its water from Lake Michigan. Small cities commonly use stand-pipes for reservoirs. These are constructed of iron or steel, and are mounted on foundations of masonry.

WATSON, *wat'son*, JOHN (1850–1907), well known under the pen name of Ian Mac-laren, an English author and clergyman, born at Manningtree, in Essex, of Scotch parents. He graduated in 1870 at the University of Edinburgh, and studied theology at New College, Edinburgh, and at Tübingen. His first charge was at Logiealmond, in Perthshire. In 1877 he became associate pastor of Saint Matthew's Church, Glasgow, and he took charge of the Sefton Park Presbyterian Church, Liverpool, in 1880. A number of sketches of humble Scottish life, which were published in the *British Weekly*, were in 1894 collected into a little volume called *Beside the Bonnie Brier Bush*, and it is by this work that he is best known. Among his other writings are *The Days of Auld Lang Syne*, *Kate Carnegie*, *The Mind of the Master* and *A Doctor of the Old School*.

WATSON, THOMAS E. (1856–1922), an American lawyer, politician and journalist, born in Columbia County, Ga. He studied at Mercer College, Macon, taught school for a time and was admitted to the bar in 1875. After practicing for a time in Thompson, Ga., he became a member of the state legislature, and was elected to Congress in 1891 as a Populist. He was defeated in the two following elections. During his term he fought for and secured the first appropriation for rural free delivery. In 1896 he was the Populist candidate for Vice-President of the United States, and in 1904 was the candidate of the same party for President. Though he made an active campaign, he received no electoral votes. He edited, at New York, *Watson's Jeffersonian Magazine* and *The Weekly Jeffersonian*. Among his published works are *Life of Napoleon*, *Life of Thomas Jefferson*, *The Story of France*, *The Roman Catholic Hierarchy* and *The House of Hapsburg*.

WATSON, WILLIAM (1858–), an English poet, author of *Purple East*, containing his best sonnets; *The Year of Shame*, an indictment of England's policy in the Orient;

The Hope of the World; Studies in Poetry and Criticism, and other works.

WATT, *waht*, in electricity the unit of power or measure of the rate of current, so named in recognition of James Watt, the inventor. It is equal to the pressure of one volt with a flow of one ampere per second. A thousand watts form a kilowatt, the measure of power; in most common use 746 watts equal one horse power.

WATT, *waht*, JAMES (1736–1819), a Scottish engineer, celebrated for the improvements he made in the steam engine. He was born at Greenock, Scotland. Having determined to adopt the trade of making mathematical instruments, Watt went to London, at the age of eighteen, to learn the art; but ill health compelled him to return after only a year's apprenticeship. Shortly after his return he was appointed maker of mathematical in-



JAMES WATT

struments for the University of Glasgow. Resigning this position after a time, he worked as a civil engineer, making surveys for canals and harbors. In 1764 while repairing a Newcomen engine, Watt made experiments which resulted in the improvements that have made his name famous. In partnership with Matthew Boulton, a Birmingham manufacturer, he founded, at Soho, a factory where, in 1774, was completed the prototype, in principle, of the steam engine of to-day.

Watt was a fellow of the Royal Societies of London and Edinburgh and a member of the National Institute of France. Besides improving the steam engine, he invented or improved a variety of mechanical appliances, including a letter-copying press, a machine for reproducing sculpture and a fuel-saving furnace. See STEAM ENGINE.

WATTEAU, *vah to'*, JEAN ANTOINE (1684–1721), one of the most celebrated painters of the eighteenth century, born of humble parents, in Flanders. At eighteen he went to Paris, where after years of struggle in obscurity he became a court favorite. In time his reputation extended throughout

Europe. His name is chiefly associated with a style characterized by ideal gardens and woodlands peopled with richly costumed men and women, who disport themselves with all the airs and formal graces of the times. In 1717 Watteau became a member of the Academy. He was a favorite of Frederick the Great, and to-day the finest collection of Watteaus in the world is owned by Germany.

WATTERSON, *wat' tur son*, HENRY (1840-1921), for nearly fifty years one of the most influential newspaper editors in the United States. He was born at Washington, D. C., was privately educated and at the age of twenty joined the staff of the *Washington Star*. He removed to Nashville in 1861, where he edited the *Republican Banner*, and during the Civil War he served in the Confederate army. The *Republican Banner* was revived after the close of the war; and in 1867 Watterson went to Louisville, where he founded the *Journal*, later consolidated with the *Courier*, and then known as the *Courier-Journal*. He steadily refused office, but in 1876 he accepted a seat in Congress, serving with distinction, but declining reelection. From 1872 to 1892 he was a delegate at large to every Democratic national convention, and he was until his retirement from active service in 1918 a power in national politics, through his editorials in the *Courier-Journal* and his strong personality. In 1919 he published *Looking Backward*, a series of sketches in which he reviewed in a personal vein his country's history for five decades.

WATTS, *wots*, GEORGE FREDERICK (1817-1904), an English artist, famous for his portraits, but chiefly for allegorical and symbolical pictures in which he attempted to show the power of love and the ugliness of greed. Watts was born in London, and at the age of thirty he married the actress Ellen Terry. The marriage was soon annulled. Among his more important pictures are *Love and Death*, now in Washington; *Life's Illusion*, *The Window Seat* and *Sir Galahad*. He is one of the most subtle and powerful of portrait painters, among his successful work in this line being portraits of Tennyson, Millais, Sir Frederick Leighton, Cardinal Manning and Browning.

More than almost any other artist, he devoted himself to the artistic interests of the nation, gratuitously decorating the din-

ing hall of Lincoln's Inn and giving the best of his work to form the nucleus of the National Gallery of British Art. The principles of his art are best summed up in his own words, "The end of art must be the expression of some weighty principle of spiritual significance, the illustration of great truth."

WATTS, ISAAC (1674-1748), an English clergyman and writer, noted for his hymns. He was born at Southampton. After tutoring six years, he became minister of the Independent Church in Mark Lane, in 1702. A severe illness ended this engagement and Watts spent the remainder of his life with Sir Thomas Abney, at Theobalds. Among his works are *Divine and Moral Songs for Children*, *Hymns and Spiritual Songs*, *Psalms of David Imitated and Horae Lyricae*, the last three containing nearly five hundred hymns and versions. "When I survey the wondrous cross" is said to be Watts's finest hymn, and with Ken's *Morning Hymn*, Charles Wesley's "Hark, the Herald Angels" and Toplady's "Rock of Ages," it stands at the head of all hymns in the English language.

WAUKEGAN, *waw ké'gon*, ILL., the county seat of Lake County, thirty-five miles north of Chicago, on Lake Michigan and on the Chicago & North Western and the Elgin, Joliet & Eastern railroads. It has an excellent harbor, with boat service to Chicago, Milwaukee and other lake ports, and is the center of a large trade in farm and dairy products. Industrial establishments include steel and wire works, brass and iron foundries, tanning factories, a sugar refinery and manufactories of locks, boats, doors, motors and ladies' garments. Notable features are the government harbor and piers, Federal building, courthouse, Carnegie Library and Masonic Temple. Sheridan Road, an automobile boulevard extending from Chicago to Milwaukee, passes through Waukegan; on this road just north of the city is the Bowen Country Club, the summer camp of Hull House, Chicago. The Great Lakes Naval Training Station is located three miles south of the city.

Waukegan was settled by New England and Southern frontiersmen interested in establishing a shipping point for grain. It is said to be older than Chicago, and at one time it promised to surpass the younger settlement. It was incorporated as a village

in 1849, became a city in 1859, and adopted the commission form of government in 1911. Population, 1910, 16,069; in 1920, 19,199, a gain of 20 per cent.

WAUKESHA, *waw' ke shaw*, Wis., the county seat of Waukesha County, seventeen miles west of Milwaukee, on the Fox River and on the Chicago, Milwaukee & Saint Paul, the Chicago & North Western and the Milwaukee, Saint Paul & Saulte Sainte Marie railroads. It has numerous mineral springs, and its principal industry is the bottling and shipping of water. There are also structural steel works, steel-bridge and malleable-iron works, plow and motor works and canning factories. Carrol College and the state industrial school for boys are located here. Other features of interest are the Rest Haven sanitarium, the courthouse, a public library and three parks. The place was settled in 1836, and incorporated in 1848. Population, 1910, 8,740; in 1920, 12,558.

WAUSAU, *waw' saw*, Wis., the county seat of Marathon County, 180 miles northwest of Milwaukee, on the Wisconsin River and on the Chicago & North Western and the Chicago, Milwaukee & Saint Paul railroads. It is surrounded by a lumbering, agricultural and dairying section, which also has extensive granite quarries. The river furnishes good water power, and the city maintains sawmills, sash and blind factories, machine shops, box factories, canneries and flour mills establishments. A county training school for teachers, a county school of agriculture and domestic science, an asylum for the insane and a tuberculosis sanitarium are located here. The city also has a public library, a hospital, a fine courthouse and a city hall. The place was settled in 1842, and was at first known as Big Bull Falls. It was chartered as a city in 1872. Population, 1910, 16,560; in 1920, 18,661.

WAVES, *wayvz*, disturbances in matter, which result in carrying force from point to point, often to a great distance. The most familiar *visible* waves are those produced by the wind on the surface of a body of water. *Invisible* waves are those minute vibrations produced within a body, by striking it or by some other means of agitation. These waves are manifest through their results, as in sound, heat and light.

When waves are produced by the disturbance of a small quantity of liquid, as by throwing a pebble into a pool, they appear

to advance from the point where the pebble strikes, in widening, concentric circles, the height of the wave decreasing gradually as the circle enlarges. There is, however, no progressive motion of the liquid itself, as may be seen by watching a body floating on its surface. This is true of large, as well as small, waves, and the waves of the ocean, which sometimes reach a height of forty feet or more, do not cause the water to move forward. Breakers are caused by the friction of the water on the bottom of the sea, which retards the motion at the base of the wave and causes the crest to break over it. They never occur in deep water.

WAX, a solid, fatty substance derived from animal and vegetable sources. A by-product of petroleum, paraffin, is a similar product, having a number of uses. The chief kinds of animal wax are *beeswax* and *spermaceti*. The first is secreted by bees to build their cells. It is used in the arts for modeling, and in making ointments, plasters and candles. Spermaceti, a constituent of whale oil, is used for making toilet creams and candles. A wax secreted by the pores of sheep and extracted from the cut wool is used in dressing leather. Myrtle wax, palm wax and Japanese wax are of vegetable origin. From myrtle wax bayberry candles are made. Vegetable wax is the basis of the finest Japanese lacquers.

WAX MYRTLE, or **WAX TREE**. See CANDLE-BERRY.

WAXWING, a handsome singing bird, distinguished by its high, pointed crest, yellow band across the end of the tail and red spots on the wings, which have the appearance of sealing wax. The body plumage is reddish-brown above, yellowish underneath. The cedar waxwing is found in nearly every part of North America,



WAXWING

and may be seen in summer as far north as Southern Alaska. It feeds on insects

and fruits, and nests in trees. The eggs are putty-colored, with black specks. The *Bohemian waxwing*, a familiar bird in both eastern and western hemispheres, also migrates to high latitudes in the nesting season, traveling, like the cedars, in small flocks.

WAY BILL. See BILL OF LADING.

WAY'CROSS, GA., the county seat of Ware County, ninety-seven miles southwest of Satilla River and on the Atlantic Coast Line, the Waycross & Southern, the Waycross & Western and the Atlanta & Birmingham railroads. It is the center of a fertile section, in which are grown cotton, fruit, live stock, pecans and sugar cane. There is abundant timber, and the city has large saw and planing mills. Other industrial establishments are railway shops, an overall factory, a packing plant, a turpentine plant, a cotton gin, a cold storage plant and a fire-proof warehouse for cotton. There are a Federal building, a courthouse, a Y. M. C. A., Kings Daughters' Hospital and Baptist Institute. Population, 1910, 14,485; in 1920, 18,068, a gain of 25 per cent.

WAYNE, *wane*, ANTHONY (1745-1796), an American revolutionary leader, called "Mad Anthony" Wayne because of his brilliant bayonet charge on Stony Point in 1779, the most daring feat of the Revolutionary War. He was born at Easton, Pa., and was prominent in the patriotic movements before the Revolution. He served in the Pennsylvania legislature and in 1775, when the war broke out, he joined the army, was colonel of a volunteer regiment, and early in 1776 accompanied the expedition to Canada. For some time he was in command of a fort at Ticonderoga, and he afterward took part in the battles of Brandywine, Germantown and Monmouth. He captured Stony Point with a light infantry corps and became a popular idol; this was one of the romantic episodes of the war.

After the surrender of Cornwallis at Yorktown, at which he was present, he served for a time in Georgia and South Carolina. After the close of the war he held a number of civil offices in Pennsylvania and then removed to Georgia. In 1791 and 1792 he represented Georgia in Congress. In 1792 he was made general in chief of the United States army and was given command of an expedition against the Indians in the West. He defeated them at Fallen Timbers in August, 1794, and he concluded with them

the Treaty of Greenville, by which the United States gained a large tract of land.

WEALTH, *welth*, a term used in economics to signify all material goods that have value. There are three essential qualities for objects classified as having value; they must be useful, must be limited in supply, and must be transferable. Gold, for example, comes under the category of wealth, for it has utility, it is produced in limited quantity, and it can be taken from one place to another. Health, while it is of priceless value to the possessor, is not wealth, for it is not a material thing. The possession of health is an aid to one who seeks to acquire wealth, but is not wealth itself, according to the terminology of economics. The same statement can be made of intelligence, physical strength, skill, education, and other intangible possessions that are in themselves of great value to man.

Circumstances alter the relative value of objects classified as wealth. On a desert island a shipwrecked sailor with a belt of money would consider food and drink of far greater value than his gold. If he were rescued and taken to a country where food was plentiful his money would be again classified as wealth. The four phases of wealth—production, exchange, distribution and consumption—are fundamental in the consideration of the economic structure of the world.

Related Articles. Consult the following titles for additional information:

| | |
|-------------|-------------------|
| Capital | Profit Sharing |
| Consumption | Socialism |
| Credit | Supply and Demand |
| Economics | Wages |
| Money | |

WEASEL, *we'zel*, a small, carnivorous animal, a native of almost all the temperate and cold parts of the northern hemisphere. The body is extremely slender, the head small and flattened, the neck long and the legs short. It preys upon mice, birds and other small animals and is very destructive to poultry. The weasel is usually nocturnal in its habits. It is a fine hunter, having a very keen scent and sharp sight, and, being unwearying in pursuit of its victim, it often wears to exhaustion animals larger than itself. Several species are common in the United States, and others are found in most parts of the temperate zones. The *long-tailed*, or *New York weasel* is one of the most familiar species in North America. It is dark brown above and white beneath, and in winter in cold climates

it turns pure white, except for the tip of the tail, which is black.

Related Articles. Consult the following titles for additional information:

Ermine
Ferret

Polecat
Sable



WEATHER BUREAU,
weth'ur bu'ro, a government bureau maintained by all civilized countries for the purpose of studying weather conditions and giving useful information thereon to the people. Mark Twain once said, "People have been talking about the weather for years, but nothing has ever been done about it." As a matter of fact, considerable has been done

about it by the weather bureaus. Nobody can ward off a storm sure to be destructive to crops, but the approach of such a storm can be foretold and precautions may be taken to lessen its menace. Warnings of floods, frost predictions, advice on rainfall, recommendations as to irrigation needs—these and many other practical suggestions come from the weather bureaus and help to moderate the tyranny of the weather, which it must be confessed, is a force for good and for ill in the life of nearly every person. The United States Weather Bureau is typical of those of other countries, and in efficiency and in the practical service it renders it is one of the best in the world.

United States Weather Bureau. Previous to the Civil War several attempts to maintain a systematic weather service were made, but on the breaking out of that conflict all these were abandoned. The United States Weather Bureau was organized in 1870 as a division of the signal service in the War Department. The organization was under the supervision of General Albert J. Myer, chief signal officer of the army, and it was adopted by Congress as a national service. Under General Myer's management, *signal stations*, as they were then called, were established throughout the country and were under the direction of a corps of trained weather observers. In 1891 the weather department of the signal service was made a bureau of the Department of Agriculture.

The Weather Bureau is organized into a

number of divisions, each of which carries on its special line of work. The most important of these are the following:

(1) **The Forecast Division**, which receives twice a day reports from stations in the United States, the West Indies, Europe, Asia, Alaska and Hawaii, and makes charts showing the conditions embodied in these reports. These charts are the regular weather maps of the bureau and include forecasts for the entire northern hemisphere. Their predictions are for twenty-four or forty-eight hours.

(2) **The Division of River and Flood Service**, which obtains information concerning the amount of rainfall, ice and snow in the basins of the principal rivers, whether navigable or not. The information which this division gives is for facilitating commerce and especially for protecting river valleys from floods, of which it aims to give ample warning.

(3) **The Division of Climate and Crops.** This division maintains a staff of voluntary observers, who give reports of the temperature, rainfall and other important data pertaining to the welfare and growth of crops in different parts of the country. This information is published in weekly and monthly crop bulletins, which are regarded as the highest authority on crop conditions of the country and are of the greatest benefit to agricultural interests.

(4) **Other Divisions.** These include divisions which have charge of examining and testing all instruments used, a division of records and divisions of telegraphy, publications and supplies.

The official organ of the bureau is the *Monthly Weather Review*, each issue of which contains statements of the weather conditions, their influence on crops in different parts of the country and various other articles pertaining to the work of the bureau and of general interest to the public.

Observing Stations. There are over 200 regular meteorological stations in the United States. Each of these is in charge of trained observers and is equipped with a full set

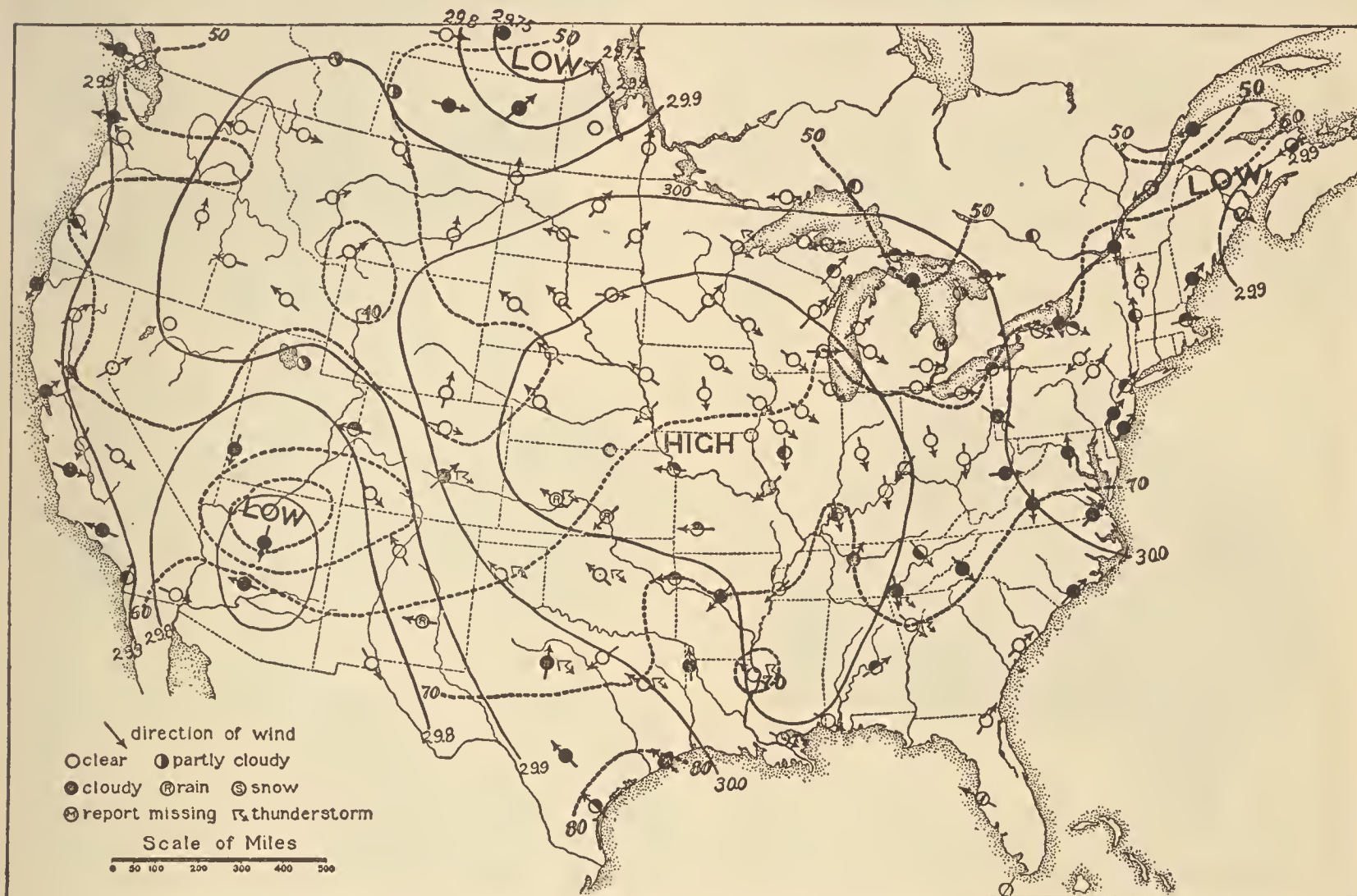


FIG. 1

of instruments. These observations are taken at 7:45 A. M. and 7:45 P. M. Washington time, and the results are telegraphed to the central station of the district and to the office at Washington, from each of which maps are issued and reports transmitted to the country. These stations and numerous

other substations indicate the local weather conditions by the display of signals. A white flag (1 in Fig. 1) indicates fair weather. A flag with the upper half white and the lower half blue (2 in Fig. 1) indicates local rain or snow. A full blue flag (3 in Fig. 1) indicates general rain or snow. A triangular blue flag (4 in Fig. 1) indicates

triangle above indicates storm with wind from the northeast, and with the dark triangle below, storm with a wind from the southeast (see Fig. 3). The hurricane warning consists of two red flags with black centers, one above the other (see Fig. 4). Forecasts are also displayed in post offices and other public places, and in some sections of



UNITED STATES WEATHER MAP

change of temperature. When placed below another flag it indicates colder, and when placed above, warmer. A white flag with a black square in the center (5 in Fig. 1) indicates a cold wave, which means a drop in temperature of from 15° to 20° .

The direction of winds is indicated by triangular flags, which are generally used in connection with storm warnings. The warning flag is red, with a black square in the center. When this is displayed with a triangular white flag above it, it indicates a storm with wind from the northwest. With the white flag below, it indicates a wind from the southwest (see Fig. 2). The warning flag with a dark

the country they are given by a series of signals by the whistles of locomotives.

Weather Charts. Through telegraphic reports received from all parts of the country

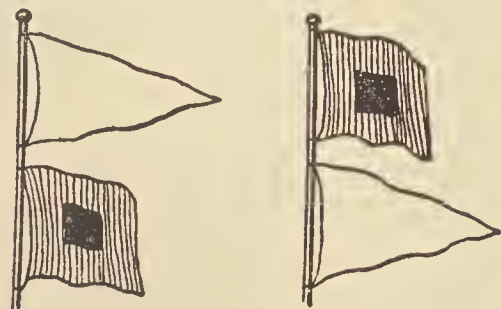


FIG. 2

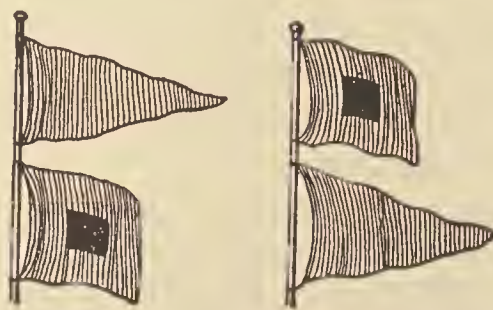


FIG. 3



FIG. 4

twice each day the United States Weather Bureau constructs, twice daily, weather charts showing areas of high and low barometric pressure, the former generally indicating centers of storm disturbance; the general temperature of the different sections of the country, those of equal temperatures being connected by lines called isotherms;

the direction of winds and the condition of the atmosphere, the latter being denoted as cloudy, partly cloudy or clear, and including presence of rain, snow or thunderstorms. By comparing the map under construction with previous maps and with the latest reports from the various stations, the forecaster is able to tell in what directions the areas of low pressure are moving, and at what speed, and can thus predict, with reasonable certainty, changes of weather in all parts of the country. As to changes in temperature and the velocity and the direction of winds, information furnished by the bureau is almost never far wrong, but so many influences affect the condition of the atmosphere that it is more difficult to predict



SOCIABLE WEAVER BIRD'S NEST

changes in this respect. The weather map shown here is an exact copy of one furnished by the government.

Canadian Bureau. In the Dominion of Canada the Meteorological Service, a division of the Department of Marine and Fisheries, performs the same tasks as the American Weather Bureau. The superintendent of the service has his headquarters at Toronto, Ont., and acts also as director of the Toronto Magnetic Observatory.

Related Articles. Consult the following titles for additional information:

| | | |
|-----------|-------------|---------|
| Climate | Isobars | Rainbow |
| Cyclone | Isothermal | Snow |
| Frost | Lines | Storms |
| Hail | Meteorology | Tornado |
| Humidity | Rain | Wind |
| Hurricane | | |

WEAVER, we'vur, JAMES BAIRD (1833-1912), an American political leader, born at Dayton, Ohio. He graduated from the law school of Ohio University in 1854, served in the Civil War and was brevetted brigadier-general at its close. He removed to Iowa,

entered journalism, as editor of the *Iowa Tribune*, at Des Moines, and became a member of Congress in 1879 and again in 1885. In 1880 he was made the Greenback candidate for President of the United States and in 1892 was the candidate of the People's or Populist party, receiving twenty-two electoral votes.

WEAVER, we' ver, BIRD, a small bird resembling the finch, with pointed wings, a



WEAVER BIRD

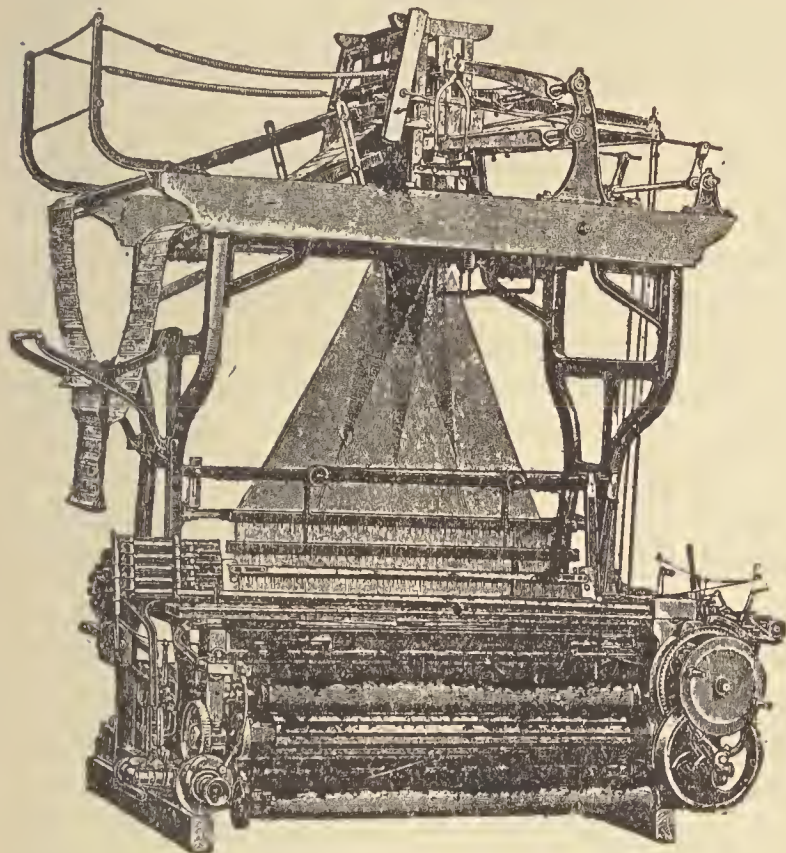
sharp, conical bill and unusually long claws. The name has reference to the bird's manner of building its nest, which is a wonderful structure of woven vegetable substances. The form and workmanship of the nests vary with the several species. The *yellow weaver*, or *baya*, of India, builds a long, bottle-like nest, and hangs it from a slender branch of tree or shrub, often over the water, where it is impossible for anything but a bird to enter. The *sociable weaver birds* build a large dome-shaped structure, or roof, in the forks of branches, and underneath this common roof many families build their nests, each with a separate entrance. While all members of the community work on the roof, each pair works alone on its own nest. See BAYA.



BAYA'S NEST

WEAVING, we'ving, the art of making cloth by means of a loom, from threads or yarn. It is not known when weaving was first practiced, but it is certain that it is one of the earliest of the arts, and it seems probable

that hand looms were invented independently by several of the ancient nations. The Greeks and Romans brought the weaving art to a high degree of perfection. Among modern countries Italy was the first to acquire fame for the manufacture of woolen



JACQUARD LOOM

and cotton cloths. France, England, Germany and the United States later developed extensive weaving industries. Since the fibers of wool are much more easily worked than are those of cotton or flax, woolen cloth has always been made among the more primitive peoples before they attempted fabrics of linen or cotton.

In weaving, two sets of threads are necessary, one running lengthwise of the cloth, and called the *warp*, the other running crosswise, and called the *weft*, or *woof*. The threads of the warp are arranged on the loom by being wound on a yarn beam, at the back, and stretched evenly to the front, where they are fastened to another beam, upon which the cloth is to be wound. In passing from one beam to the other, the warp threads are laid through the *heckles* and also through a comb on the batten. In laying the warp, every other thread passes through one heckle, and the alternate thread passes through the other. The weft is wound upon bobbins, which are placed in the shuttle, by means of which the weft is laid in position. Weaving by hand loom includes the following steps: (1) Pressing a treadle, which is connected with the heckles by a cord that passes over a pulley on the top of the loom. This spreads the

threads of the weft, raising one-half and lowering the others, so that they form an angle called the *shed*. (2) Throwing the shuttle across the warp and thus laying the thread of the weft in position. (3) Striking this thread with the batten, so as to drive it close up against the one previously laid. (4) Springing down the opposite treadle and thus preparing the web for the next thread of the weft.

Weaving in these times is almost exclusively done by power looms, operated by steam or electricity. Simple as the hand loom is, it contains the elements of all modern looms. The complexity of the pattern may be increased by placing more than two frames in the heckle and dividing the weft into more parts, also by inventions which raise certain threads in the warp at one time and certain others at another. An invention known as the *Jacquard* loom operates upon this plan. Any number of cords can be used, so that a pattern of any degree of complexity is possible, and since all cords are tied together in the form of an endless chain, the pattern may be repeated indefinitely.

WEBB CITY, Mo., a city in Jasper County, five miles northeast of Joplin, on the Frisco and the Missouri Pacific railroads. It is the center of the zinc and lead mining district of Southwestern Missouri. Mining plants in the vicinity number about two hundred, and there are in addition machine shops, foundries, a cement block factory and a brick and tile plant. The city has a Federal building, a hospital and a public library. It was settled in 1873 and incorporated in 1876. Population, 1910, 11,817; in 1920, 7,807, a loss of 34 per cent.

WEBER, KARL MARIA FRIEDRICH ERNST VON (1786–1826), a German composer, born at Eutin in Holstein. His father was a musician and gave him a good musical education. At the age of fourteen he wrote an opera, and in 1803 he visited Vienna, where he became acquainted with Haydn. He procured a musical directorship in Breslau, on which he entered in 1804, leaving it only to accept, successively, several more important positions. In 1820, at Berlin, he produced *Der Freischütz*, the most celebrated of his compositions. It was performed in London and Paris two years later. In 1822 *Euryanthe* was brought out, and in 1826 Weber visited London to superintend the production of *Oberon*, which he had com-

posed for Covent Garden Theater. Shortly after its enthusiastic reception, the composer died in London. Besides the operas mentioned, Weber wrote a large number of works for the piano, notably the *Invitation to the Dance* and the *E flat major Polonaise*. He was the forerunner, in style, of Wagner, whom he strongly influenced.

WEBSTER, DANIEL (1782–1852), American orator and statesman, born in the township of Salisbury, N. H. His father was a backwoods farmer, who had previously been a hunter and soldier, and Daniel owed his first education to his mother. Later, in the intervals of farm work, he attended village school, and when he had reached the age of fif-



DANIEL WEBSTER

teen, his father made some generous sacrifices to send him to Dartmouth College, where he remained four years. After studying privately and in a Boston law office, he entered the law in 1804, settled at Portsmouth, N. H., and prospered.

Webster at first took little interest in politics, but in 1812, having already established a commanding reputation, he was elected to Congress by the anti-war party. He was placed on the committee of foreign affairs, and his maiden speech, delivered on June 10, 1813, upon the Berlin and Milan decrees, took the House and country by surprise by its display of rhetorical power and wealth of historical knowledge. His subsequent speeches on the increase of the navy, which he warmly recommended, and the repeal of the embargo, placed him in the first rank of debaters.

In 1816 Webster retired for a time from political life, removing to Boston to devote himself to his profession. For nearly seven years afterward, with a single exception, he filled no public office, but as an advocate and counselor achieved a preëminent position at the American bar. His strongest powers were displayed in arguing points of constitutional law, and his achievements in this direction drew upon him the attention of the whole country. In 1820, on the celebration of the bicentenary of the landing of the Pilgrim Fathers, he delivered an oration which added greatly to his fame as an orator,

and he continued to gain in public esteem through other great addresses, notably those at the laying of the cornerstone of Bunker Hill Monument in 1825 and at the memorial service for Adams and Jefferson in 1826.

In 1822 he was elected to Congress, and was reëlected in 1824 and 1826. At the end of his last term he was chosen Senator for Massachusetts. In January, 1830, he delivered a remarkable speech in favor of the nationalist view of the Constitution, in reply to a speech by Robert Y. Hayne of South Carolina. The address created a sensation throughout the Union and probably was more widely circulated throughout the country than any other in previous American history. Webster was strongly opposed to the nullification movement of Calhoun and the South Carolina school, and his eloquence in support of Jackson's energetic measures did much to prevent secession. In 1836 he was an unsuccessful candidate for the Presidency, and from 1841 to 1843 was Secretary of State under Harrison and Tyler. The chief event of this period was the negotiation of the famous Webster-Ashburton treaty with England, which was equally advantageous and honorable to both parties.

Webster generously supported Clay's candidacy for the Presidency in 1844; and was himself an unsuccessful aspirant for the Whig nomination in 1848. In 1845 he was reëlected to the Senate, and in the struggle over the admission of Texas and California he strongly favored the Northern, or anti-slavery, side. Afterward, however, when public excitement had reached a dangerous height, he supported a policy of compromise, and March 7, 1850, he made a speech in favor of obedience to the Fugitive Slave Law. The same year he was appointed a second time Secretary of State, which office he held till his death.

Webster's guiding principle in politics was the preservation of the Union, for which he was ready to make all sacrifices, opposing the nullifiers, on the one hand, and the abolitionists, on the other. One of his best remembered utterances is that from the *Reply to Hayne*, ending with the exclamation, "Liberty and Union, now and forever, one and inseparable!"

Related Articles. Consult the following titles for additional information:

Calhoun, John C.
Clay, Henry
Nullification

Webster-Ashburton
Treaty

WEBSTER, HENRY KITCHELL (1875–), an American novelist, born at Evanston, Ill., and educated at Hamilton College. After graduation he taught English for a year in Union College and then began the publication of stories that soon gained for him a place as one of the most popular of American story writers. Among the stories that first brought him into prominence were *The Short Line War*, *Comrade John* and *Calumet K*, all written in collaboration with Samuel Merwin. Novels of which he is exclusively the author are *The Story of a Corner in Land*, *Roger Drake*, *The Sky Man*, *The Ghost Girl*, *The Butterfly*, *Real Adventure*, *The Thoroughbred*, *The Painted Scene* and *An American Family*.

WEBSTER, NOAH (1758–1843), an American lexicographer, author of the original *Webster's Dictionary* and of *Webster's Spelling Book*. He was educated at Yale and prepared for the law, but gave it up for teaching. His experience in schools led to the composition of his *Spelling Book*, which was published in 1784, and of which it is said that 62,000,000 copies have been sold. About 1807 he began work upon his *American Dictionary of the English Language*. In preparing this work he visited England and worked for some months at Cambridge. The first edition of the dictionary was finished in 1828, and a second edition was published by Webster in 1840. This work was the basis of the standard *Webster's International Dictionary*.

WEBSTER-ASHBURTON TREATY, a treaty concluded at Washington in 1842 by Daniel Webster, then Secretary of State, and Lord Ashburton, minister of Great Britain to the United States. It defined the north-eastern boundary between the United States and Canada, which for years had been a source of irritation between the two countries.

WEDGE, *wej*, one of the so-called mechanical powers used in the construction of machines, formed of a combination of two inclined planes. Wedges of wood or metal are used for splitting various substances or for exerting strong pressure in a small space. The axe, with its thin and its broad edge, is one application of the principle of the wedge. See **MECHANICAL POWERS**.

WEDGWOOD, *wej'wood*, **WARE**, a superior kind of glazed pottery, capable of taking the most brilliant and delicate colors. It is

usually decorated with classic designs, often in relief upon a solid ground. It is used not only for the table, but also for ornament; and, owing to its hardness and property of resisting the action of all corrosive substances, it is commonly used for mortars in laboratories. The ware was named after the inventor, Josiah Wedgwood. See **POTTERY**.

Josiah Wedgwood (1730–1795), one of the greatest of English potters, was born at Burslem, of a family of successful potters. At the age of eleven he began making pottery on a wheel. The loss of a leg compelled him to give up this work, and he afterwards became head of his own pottery works and the most famous of English potters. Wedgwood made many improvements in the manufacture of earthenwares, and all subsequent work in this field has reflected his powerful influence.

WEDNESDAY, *wenz'day* (Woden's day), the fourth day of the week.

WEED, THURLOW (1797–1882), an American journalist, born at Cairo, N. Y. At the age of twelve he began to learn the printer's trade in Catskill, N. Y., and ten years later he was editing. He founded the *Onondaga County Republican*, and in 1824 became editor and owner of the *Rochester Telegraph*. He was elected to the legislature in 1826, and at the close of his second term he established the *Albany Evening Journal*, a Whig paper, which he edited for thirty-three years. During the Civil War, at the instance of President Lincoln, he was sent to Europe on a semi-official mission, and he did much to remove the misapprehensions as to the war, and to induce foreign governments to refrain from interference. In 1867 he became editor of the *New York Commercial Advertiser*, which position he resigned on account of failing health. He was the author of *Letters from Europe and the West Indies* and an *Autobiography*.

WEEDS, a term applied to plants growing wild in uncultivated grounds and in most cases very troublesome. Many plants when grown and cultivated in gardens, as the gold-enrod and the dandelion, are classed as flowers, while the same plants, running wild in uncultivated ground, are considered as weeds. The chief ways in which weeds are injurious are: (1) They increase the labor necessary to cultivate the soil; (2) they take up food from the soil, which should go to useful plants; (3) their foliage smothers the young

plants; (4) they sometimes are poisonous to cattle. Care should be taken to eradicate them as soon as they begin to grow. There are various ways to prevent their growth, different weeds requiring different methods. Planting of pure seed, diligent tillage of the soil, rotation of crops, cultivation of all open land with crops, are some of the means used. Some weeds while young can be destroyed without injury to the crop, by spraying the field with certain chemicals, called *herbicides*. Weeds are often of service to a farmer, in aiding him to know the needs of his land, since many kinds grow only where the conditions are peculiarly adapted to them. See HERBICIDES.

Related Articles. On page 517, in the article Botany, is a further discussion of the subject of weeds. For descriptions of the common weeds, consult the following titles:

| | | |
|----------------|---------------|-------------|
| Abutilon | Dandelion | Mullein |
| Agrimony | Dock | Pigweed |
| Bindweed | Feverfew | Plantain |
| Botany | Fleabane | Ragweed |
| Burdock | Goosefoot | Sand Bur |
| Canada Thistle | Gromwell | Sow Thistle |
| Cocklebur | Indian Mallow | Stramonium |
| Cow Parsnip | Milkweed | Thistle |

WEEK, a period of seven days, one of the conventional divisions of time, the origin of which is doubtful. Among the ancient nations who adopted the week as a division of time, are the Chinese, the Hindus, the Egyptians, the Chaldeans, the Jews, the Persians and the Peruvians. In some cases the name has been applied to cycles of time other than that of seven days. The nations with whom the weekly cycle has been traced with certainty to the greatest antiquity are the Egyptians and the Hebrews. The use of the week was introduced into the Roman Empire from Egypt, about the first or second century of the Christian Era, and it had been recognized independently of Christianity before the Emperor Constantine confirmed it by enjoining the observance of the Christian Sabbath.

WEEVIL, *we'v'l*, the name applied to a group of very small beetles, most of which have long snouts, slightly curved downward. They are very destructive to the products of agriculture, some of them injuring the plants, others ruining the fruit or seed. With the long snout the insects of some species bore into nuts, grain or fruit and eat out the interior. Sometimes they deposit their eggs in the fruit, or seeds, so that the larvae will have food when hatched. In this way weevils often hatch out in meal, flour, rice and such food stuffs, spoiling them.

The *boll weevil*, which attacks the cotton boll, is one of the worst pests in the United States, having caused enormous losses to Southern farmers. It is a grayish weevil one-fourth of an inch long. It lies torpid in winter, and when the cotton comes up feeds on the leaves and blossoms. The eggs are deposited in the cotton boll, which the maggots destroy. There are four or more generations each summer. The *alfalfa weevil* is another species of considerable economic importance, and the United States Department of Agriculture has employed stringent measures to have it checked. Peas and beans are among other crops subject to weevil attack. The insects breed in the growing pod and also in stored beans and peas. When infested, the beans float in water and should not be planted. See BOLL WEEVIL.

WEIGHING, *way'ing*, **SCALE**, a mechanical contrivance for ascertaining the weights of substances. The simplest form of the weighing machine is the balance formerly used by grocers. It consists of a horizontal beam pivoted in the middle and having at one end a deep pan, in which was placed the article to be weighed, and at the other a horizontal disk. Pieces of iron of graduated size and ranging in weight from an ounce or less to several pounds were used on the disk to balance the article to be weighed. A modification of this scale is the unequal beam balance; based on the principle of the lever. The horizontal beam is not pivoted at the middle point, but near one end; the weight to be determined is placed upon the shorter end and is balanced by a much smaller weight at the long end.

The *platform scale* is a typical example. It consists of a hinged platform, set above a stationary platform, which sinks under a weight and presses upon a lever underneath. The lever is connected with a vertical rod attached to the short end of the horizontally-pivoted beam already described. The longer end, or lever, of the beam is marked off in a graduated scale. The article to be weighed is placed on the platform, which sinks under the weight, pressing upon the lever, which conveys the pull to the vertical rod connected with the beam. The weight on the long end of the beam is moved along the scale until it balances with the weight on the platform. The weight of the article on the platform is indicated by the mark in pounds at which the weight balances. A

weight of one pound on the lever may be made to balance with ten, a hundred or even a thousand pounds or more on the platform. Some of these scales are even built to weigh heavy guns and locomotives.

Among the most recent inventions of scales is a complicated device which not only weighs the goods but also computes the price of fractions of a pound.

WEIGHT, *wayt*, the measure of the force by which any body or a given portion of any substance gravitates or is attracted to the earth; in a more popular sense, the quantity of matter in a body, as estimated by the balance, or expressed numerically with reference to some standard unit. In determining weight in cases where very great precision is desired, due account must be taken of temperature, elevation and latitude. Hence, in fixing exact standards of weights, a particular temperature and pressure of air must be specified; thus the standard brass pound of Great Britain is directed to be used when the Fahrenheit thermometer stands at 62° and the barometer at thirty inches. See, also, GRAVITATION; WEIGHTS AND MEASURES; METRIC SYSTEM.

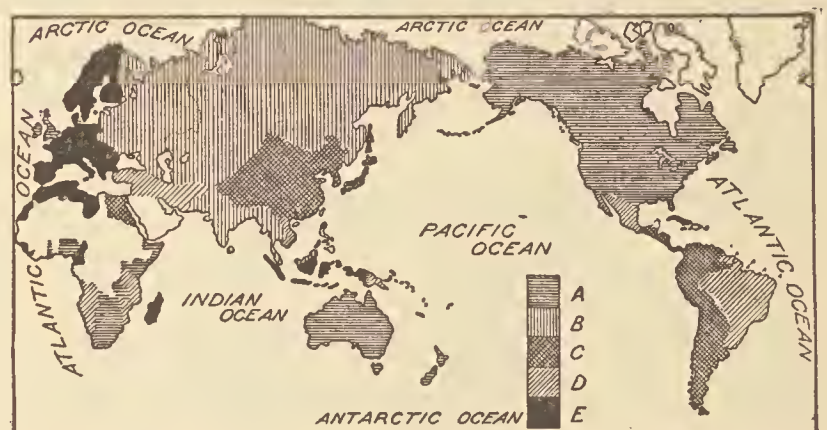
WEIGHTS AND MEASURES, the standards used in measuring quantities. Most of the common standard units have been chosen arbitrarily, though efforts have always been made to have the units conform to some natural rule. Evidences of this fact remain in the names of both ancient and modern units, such as the *cubit* of the Egyptians and Hebrews, which was the length of the forearm, and the *foot* of the Greeks, which was the length of a man's foot.

The so-called *English* system of weights and measures, used in the British Empire and the United States, dates from a law passed in 1266 in England, which provided that an English penny should equal in weight 32 wheat corns, taken from the middle of the ear; that 20 pence should make an ounce, 12 ounces a pound, 8 pounds a gallon of wine and 8 gallons of wine a London bushel. Before this time, two pound units had grown up; one, the *Troy* pound, introduced into England by William the Conqueror, weighed considerably less than that before used in England, and its introduction created such dissatisfaction that an average pound of sixteen ounces, now known as the *avoirdupois* pound, was made the standard unit

for articles in common trade, while the *Troy* pound, of twelve ounces, was retained as the unit of weight for gold, silver, gems and apothecaries' supplies.

The units of length, capacity, weight and volume have often varied and are not yet entirely uniform, but the common standards of the English system are as follows: Of length, the *yard*, consisting of 3 *feet*, each foot containing 12 *inches*; $5\frac{1}{2}$ yards equal 1 *rod*; 320 rods equal 1 *mile*. In England, the rod is called a *pole*, or a *perch*. The units of square and cubic measure are respectively the squares and cubes of the linear units, as *square yard*, *cubic inch*, etc. The *acre*, used in the measurement of land, contains 160 square rods. A *square mile* equals 640 acres.

There are two sets of measures of capacity, one for liquids and one for solids. The unit for liquid measure is the *gallon* of 231



THE WORLD'S WEIGHTS AND MEASURES

Showing the commanding position of the English system

- (A) English weights and measures established and fundamental.
- (B) English basis for linear measurements.
- (C) Local and English prevail, and are closely identical. Metric also used.
- (D) Metric, local and English.
- (E) Metric prevails, with mixture of old and English.

cubic inches. The quart, one-fourth of a gallon, contains 57.75 cubic inches. The quart is divided into two pints and the pint into four gills. Standard gallon measures are maintained in England, Canada and the United States. The quart in dry measure contains 67.2 cubic inches; eight quarts make one peck and four pecks one bushel. The standard bushel contains 2130.42 cubic inches. The metric system (which see) is used in Europe.

There are numerous terms in use in special occupations, such as the *hand*, a unit used in measuring the height of an animal, and equivalent to about 4 inches; the *fathom* (2 yards), used in measuring the depth of water; the *knot*, or *geographical mile*

(6088.27 feet), used to designate distance at sea; the *chain* (4 rods), used in surveying; the *furlong* (10 chains); a *link* (.01 of a chain); the *ell* ($3\frac{1}{4}$ feet); the *barrel* ($31\frac{1}{2}$ gallons); the *hogshead* (2 barrels). In England the barrel equals 36 gallons.

Making and keeping standards of the different units, weights and measures is in the hands of the governments of the respective nations. The work requires the greatest skill and care. In the United States these standards are prepared and kept by the United States National Bureau of Standards. In 1856 the British government sent to the United States two standards of length, which are still preserved. The same year the Treasury Department sent a complete set of weights and measures to the governor of each state. These sets are kept at the capitals of the respective states, and may be used for testing weights or measures whose accuracy is in doubt. Most states appoint inspectors whose duty it is to see that false weights and measures are not used by tradesmen.

Related Articles. Consult the following titles for additional information:

| | | |
|----------------------|---------------|-------------|
| Acre | Furlong | Mile |
| Apothecaries' Weight | Gallon | Ohm |
| | Gram | Ounce |
| Avoirdupois | Hogshead | Pound |
| Barrel | Kilogram | Quart |
| Bushel | Kilogrammeter | Scruple |
| Carat | Kilometer | Ton |
| Centimeter | Kilowatt | Troy Weight |
| Chain | Knot | Volt |
| Cubic Measure | League | Watt |
| Drachma | Liter | Weighing |
| Fathom | Mensuration | Scale |
| Foot | Meter | |

WEIMAR, *vī'mahr*, GERMANY, a quaint old city on the River Ilm, about fifty miles west-southwest of Leipzig, in the former grand duchy of Saxe-Weimar. The place is associated in a peculiarly interesting way with the new and with the old Germany. Here, in February, 1919, the first national assembly of the German republic met to establish a government based on democracy; here, in July of the same year, the Treaty of Versailles was ratified.

Weimar is famous, too, for its association with the classical epoch of German literature, and it has been called the "German Athens." Goethe, Schiller, Wieland and Herder lived here, and Goethe and Schiller are buried in the cemetery in the southern part of the town. Goethe's house is now the Goethe National Museum, and Schiller's house is also the property of the city and is open to the public. The Goethe-Schiller mon-

ument in bronze is in front of the famous court theater, in which the national assembly held its memorable sessions. Another striking building is the grand ducal palace, which was partially constructed under the supervision of Goethe. Weimar has an excellent school system, including an art school, an industrial school, a music school and other special schools. Stoves, straw hats, leather and cloth are manufactured, and the book trade is considerable. Population, about 35,000.

WELD'ING, the process of uniting two pieces of a substance when softened by heat. In the arts the term is restricted to splicing such metals as iron and platinum, though glass and several other substances can be welded as readily as these metals. The simplest method of welding iron is that employed in the ordinary blacksmith shop. The smith hammers the ends of the bars to be welded into a wedgelike form, and heats them white hot, and just as they begin to soften, he covers them with borax or some other flux, to prevent the formation of oxide. The hot ends are then laid together and hammered, the soft surfaces unite, and the joint formed is usually as strong as any other portion of the bar. In large manufactories, electricity is now very generally used for welding, a current of sufficient power to heat and soften the metals being employed. By means of this current, copper can be welded, as well as iron and steel.

WELLAND, ONT., the county town of Welland County, on the Welland Canal and on the Canadian National, the Michigan Central, the Wabash, the Pere Marquette, the Canadian Pacific and other railways. Welland has become a railroad and manufacturing center. Especially important are iron and steel products of various kinds, agricultural implements, cordage, cotton goods, chemicals, stoves, tires, concrete and furniture. There is an abundance of water power and natural gas in the vicinity. Welland has a wireless station, two government docks, a court house, a registry office and a park. Population, 1921, 8,654.

WEL'LAND CANAL, a canal on the Canadian side of the Niagara River, connecting lakes Erie and Ontario, and constituting an important link in the chain of canals extending from Lake Superior to Montreal. It was opened in 1833 and in 1871 was enlarged, the cost of improvements together with the original cost amounting to \$29,449,-

000. It is $26\frac{3}{4}$ miles long, 160 feet wide and fifteen feet deep. Work is now being carried on to increase the width to 200 feet, the



A LOCK ON THE WELLAND CANAL
depth to twenty-five feet and to reduce the number of locks from twenty-five to seven.



WELLAND CANAL

1, New Canal; 2, Old Canal; 3, Feeders.

The estimated cost of these improvements is \$50,000,000.

WELL BORING, a method of sinking wells of small diameter, for the purpose of obtaining water, petroleum or natural gas, or for discovering veins of ore.

Well boring is most frequently done by steam power. The machinery consists of a derrick, shaped like a square pyramid, about twenty feet across at the base and from seventy to seventy-five feet high; an engine for operating the machinery; a windlass for raising and lowering the drill; a walking

beam, and bits and drills of different sizes and styles. The drill is attached to a rope, which runs over a pulley at the top of the derrick and down to a drum on the windlass. A few feet above the surface, this rope is grasped by a clamp, which is attached to a screw, called the *temper* screw, used to regulate the motion of the drill. The drill is attached to one end of the walking beam, which is operated by the engine and works the drill forcibly up and down. A rotary motion is given the drill by the operator's turning the handle slightly at every stroke. When the drill has descended the length of the temper screw, it is drawn out by the windlass. If the well is dry, water is run into it, and a bucket, called the *sandpipe*, is lowered, to draw out the mud and crushed rock. This bucket is a hollow cylinder, about sixteen feet long, with a bottom that opens upward. As it descends, the bottom opens and allows the cylinder to be filled. When the cylinder is drawn out, the weight of the mud closes the valve, and in this way the well is emptied. As fast as the hole is drilled, it is cased with a steel tube. Bored wells in the oil regions vary in size from five feet to eight feet in diameter. Artesian wells are usually smaller.

Wells may be bored as deep as 3,000 or 4,000 feet. Difficulty in well boring increases with the depth, and deep wells are very expensive. See ARTESIAN WELL; PETROLEUM.

WELLES, *welz*, GIDEON (1802-1878), an American statesman, born at Glastonbury, Conn. He attended Norwich University, and on leaving there became editor of the *Hartford Times*. He was a member of the state legislature from 1827 to 1835, in the latter year becoming state comptroller. From 1846 to 1849 he was chief of the bureau of supplies of the United States navy. He joined the Republican party soon after its organization, and in 1861 was made Secretary of the Navy by President Lincoln. In this post he displayed remarkable executive ability, managing the navy with consummate skill and efficiency during the war. He also served throughout Johnson's administration. In 1872 he supported the Liberal Republican movement, and in 1876 he used his influence for Samuel J. Tilden.

WELLESLEY, *welz'ly*, RICHARD COLLEY WELLESLEY, Marquis (1760-1842), a British general and statesman, brother of the Duke of Wellington. He was educated at Harrow, Eton and Oxford and in 1784 entered

the English House of Commons. In 1797 he was made governor-general of India, and for his suppression of the insurrection of Tippu Sahib of Mysore, and for the capture of Seringapatam, he was made Marquis Wellesley in the Irish peerage. He was also successful in the struggle with the Mahrattas in 1803-1805. His administration in India, which ended in 1805, was one of the most important in the history of British rule there, owing to his financial reforms and his military victories. In 1808, Wellesley was made minister to Spain, and in the following year he became secretary of state for foreign affairs. He was chosen prime minister in 1812, but was unsuccessful in his attempts to form a cabinet. From 1821 to 1828 and from 1830 to 1834 he was lord lieutenant of Ireland.

WELLESLEY COLLEGE, an institution for the higher education of women, founded in 1875 at Wellesley, Mass. The courses are largely elective and lead to the degrees of Bachelor of Arts and Master of Arts. The college is a contributor to the American Schools of Classical Study at Rome and Athens, to the zoölogical station at Naples and to the marine biological laboratory at Wood's Hole, Mass. The faculty includes about 140 instructors; the attendance is about 1,600, and the library contains about 91,000 volumes.

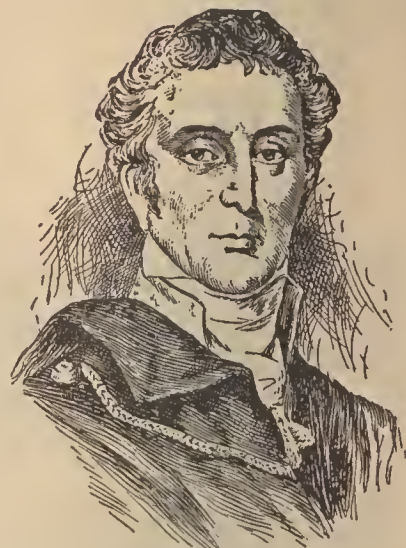
Henry Fowle Durant (1822-1881), the founder of Wellesley College, was born at Hanover, N. H., and educated at Harvard. After completing a law course he engaged in practice in Boston. Subsequently he became a layman preacher. Durant contributed between \$1,000,000 and \$2,000,000 to Wellesley College.

WELLINGTON, **ARTHUR WELLESLEY**, Duke of (1769-1852), a British general and statesman, the hero of the Battle of Waterloo. He was the son of the Earl of Mornington, and was educated at Eton, at Brighton and finally at the Military College of Angers, in France. In 1787 he received a commission as ensign in the army, and after a rapid series of changes and promotions, he attained, by 1796, the rank of colonel. During 1794 and 1795 he served with his regiment under the Duke of York in Flanders, and in 1797 his regiment was dispatched to Bengal. War had just been declared against Tippu Sahib, and Colonel Wellesley's regiment had an important part in the Battle of Malavelly and

the storming of Seringapatam. After this he was appointed to the administration of Mysore, and in 1803 he was given the command of a force engaged in a war against the Mahrattas. His successes compelled the submission of the Mahrattas, and peace was restored on conditions drawn up by the successful general.

In 1805 Wellesley returned to England, was shortly afterward elected to Parliament for Rye and in 1807 was appointed secretary of state for Ireland. In August, 1807, he received the command of a division in the expedition to Copenhagen, and he directed the only land operation of importance. In 1808 he attained the rank of lieutenant-general and received the command of a force destined to operate in the north of Spain and Portugal. He was subsequently superseded; but before giving up the command he gained the Battle of Vimeiro over Junot, the campaign being brought to a close with the Convention of Cintra, by which the French agreed to evacuate Portugal. In 1809 Wellesley was appointed to take the chief command in the peninsula, which had been overrun by the French. The passage of the Douro, and the defeat of Soult, which followed, fittingly opened this masterly campaign. For the victory at Talavera (July 28), the first of many which he won in the peninsula, the government raised Wellesley to the peerage, as Viscount Wellington.

Toward the end of 1810 he fought the Battle of Busaco, which was followed by the famous fortification and defense of the lines of Torres Vedras. Before these fortifications the French encamped for months, but they were finally compelled, by lack of supplies, to evacuate Portugal. A little later (in 1811) occurred the victory of Fuentes de Onoro. Early in 1812 Wellington took Ciudad Rodrigo and Badajoz by storm, fought the Battle of Salamanca, accounted one of his most famous victories, and in August entered Madrid. For his brilliant conduct of the campaign, he received the thanks of Parliament and was raised to the dignity



DUKE OF
WELLINGTON

of marquis. Next followed the Battle of Vittoria (1813), battles in the Pyrenees, the capture of San Sebastian and the forced retreat of Soult.

In 1814 a victory over Soult was gained, and in the same year the Battle of Toulouse, in which Soult's best troops were routed, opened the way for the British troops to the heart of France. Napoleon abdicated on April 12, and a few days later the war was brought to a close by the signing of conventions with Soult and Berthier. The triumphant general was created Marquis of Douro and Duke of Wellington and was given the thanks of both houses of Parliament. In July he went as ambassador to France and succeeded Lord Castlereagh as British representative in the Congress of Vienna, and when Napoleon returned, Wellington took command of the army assembled in the Netherlands to oppose him, winning the great victory of Waterloo. On his return to England, after the restoration of peace, he accepted the post of master-general of the ordnance, with a seat in the cabinet of Lord Liverpool. In 1822 he represented Great Britain in the Congress of Verona, and six years later he accepted the premiership, resigning the command of the forces to Lord Hill. The growing discontent throughout the country on the subject of Parliamentary reform, which Wellington steadily opposed, caused the resignation of the government in 1830. He held office under Sir Robert Peel as secretary of state, and in 1846 he helped to carry the repeal of the corn laws, which till then he had opposed. He died September 14, 1852, and was buried in Saint Paul's Cathedral. See WATERLOO, BATTLE OF.

WELLINGTON, NEW ZEALAND, the capital of the dominion of New Zealand, a seaport situated on Port Nicholson, on North Island, 1,280 miles southeast of Sydney, the nearest Australian port. It has a fine harbor and an extensive export and import trade. Manufacturing establishments include flour mills, saw mills, tanneries, foundries, soap and candle works, brick kilns, etc. Important buildings are a government building, a museum, buildings of Victoria University College, and the Wellington branch of the New Zealand Institute. Population, 1911, 64,372; with suburbs, 70,729.

WELLS, HERBERT GEORGE (1866-), one of the most forceful and original of the modern group of English novelists. He was

born at Bromley, Kent, of middle-class parents, and was educated at London University. After teaching for several years he began writing for magazines, and in 1895 produced a fantastic romance called *The Time Machine*, which met with instantaneous success. Other stories of a like character followed, including *The War of the Worlds*, *When the Sleeper Wakes* and *In the Days of the Comet*. In another series of novels of everyday life he finds opportunities to set forth his belief in Socialism, as in *The Research Magnificent* and *The Passionate Friends*. *Tono Bungay* is much admired for its excellent character drawing, and *History of Mr. Polly* for its naïve humor. In *Mr. Britling Sees It Through* Wells produced one of the outstanding books based on the World War. In 1921 appeared *Russia in the Shadows* and *The Outline of History*. The latter work was very much criticized.

WELSBACH, *vels'bakk*, **BURNER**, an incandescent gas burner composed of a cone-shaped cotton-gauze mantle of oxides of thorium and cerium. When first lighted the cotton burns away, leaving a skeleton of the oxides. By means of this burner a strong, clear light is obtained with the use of a minimum amount of gas, smoke and unsteadiness of the flame being eliminated.

Karl Welsbach (1858-), inventor of the Welsbach burner, a native of Austria and pupil of Bunsen at the University of Heidelberg. He is the discoverer of the rare elements praseodymium, neodymium and lutecium.

WELWITSCHIA, *wel wick'e a*, a remarkable plant, growing in the dry regions of southern Africa. It consists of a stem, which forms a woody mass, rising not more than a foot above the ground and having a diameter of from four inches to as many feet. From this mass grow two enormous leaves, which become dry and are often split up into shreds, but which do not fall off. Every year several short flower stalks grow up from the base of these leaves, but no other leaves are ever produced.

WENTWORTH, *went'wurth*, **THOMAS**, Earl of Strafford. See STRAFFORD, THOMAS WENTWORTH, Earl of.

WESLEY, *wes'li*, the family name of two brothers famous as the founders of the religious sect from which the Methodist Church developed. John Wesley, the elder, was the leader of the movement.

John Wesley (1703–1791) was born at Epworth, England, June 17, 1703, a son of the village rector. His mother was a woman of intelligence and piety. The boy attended the Charter-House School and later Christ Church, Oxford, from which he was graduated in 1724. A year after his graduation he was ordained to the ministry, and for a time acted as his father's curate. When in 1729 he returned to Oxford he became associated with his brother Charles and a few other undergraduates in what was derisively called the "Holy Club."

In 1735 he and his brother Charles went with General Oglethorpe to America and for three years the brothers did missionary work among the Indians. John Wesley's preaching was not particularly successful, but the trip marked the turning point in his life, for on the journey over he made the acquaintance of some Moravian Brethren whose simple piety made a deep impression on him. On returning to London he sought the Brethren, and from Peter Böhler, one of their preachers, learned the doctrine of "saving faith." In the summer of 1738 he visited the Moravian leaders on the continent, and this experience confirmed him in his new faith in the saving power of Christ. Returning to England he became associated with George Whitefield, and his real life work as an evangelistic preacher began.

His new methods aroused much opposition, and churches were closed to him. He then began preaching in the open air, gaining a large number of followers. In 1740 an important step was taken when Wesley organized his first society and appointed lay preachers, who were communicants of the Church of England, to take charge of small groups of converts. The small meetings thus provided for caused the movement to spread rapidly. In 1744 the first conference of lay preachers was held. These remained members of the Established Church; it was not until 1784 that Wesley's organization became a new denomination, separate from the Church of England. Wesley was a prodigious worker, traveling long distances and preaching three or four times a day. At the same time he produced a large volume of religious literature. In 1750 he was married to Mrs. Vazeille, a widow with four children, but incompatibility soon led to a separation. At the time of his death Wesley's followers numbered 120,000.

A man of much charm of personality, kindly wit and humor, Wesley was admired even by those who opposed his doctrines. He retained his sprightliness and interest in all about him to the last. See **METHODISTS**.

Charles Wesley (1707–1788), a noted English evangelist, brother of John Wesley, aided his brother in founding the Methodist Church. He was born in Epworth, England, and was educated at Westminster School and at Christ Church, Oxford. In 1735 he went with his brother John to America and preached in the Georgia colony. His preaching was not successful, owing to his extreme views; and in 1738, influenced by his brother, he modified his doctrines and methods and became an itinerant preacher. He then began to attract large audiences. His chief service to the Methodist movement, however, was as a writer of hymns. He produced about 6,000, some of which remain favorites in the denomination.

WESLEYAN METHODISTS, an offshoot of the original Methodist Church, which preserves the form of church government originated by John Wesley. It is chiefly represented in the British Isles. The other important branch of the denomination, distributed chiefly in America, early adopted the Episcopal form of church organization and became known as the Methodist Episcopal Church. The history of Methodism will be found in the article **METHODISTS**. See also **WESLEY**.

WEST, BENJAMIN (1738–1820), an American painter, who made his way up from humble beginnings to a place of highest distinction in the world of his day. Painting and drawing he taught himself, making his colors of leaves and berries and his brushes of hair from his cat's tail. At the age of eighteen he established himself as a portrait painter in Philadelphia. In 1760 he went to Rome, where his *Cimon and Iphigenia* and *Angelica and Medora* received favorable comment. Three years later he went to England; and so cordial was his reception that he decided to make London his home. For King George III, his patron for more than thirty years, he executed a series of historical and religious paintings for Windsor Castle. On the death of Sir Joshua Reynolds, in 1792, he became president of the Royal Academy. The best of his historical paintings are *The Death of General Wolfe*, *Penn's Treaty with the Indians*, *The Battle of La Hogue* and *The Black Prince at Poitiers*. Among his re-

ligious pieces, the most notable is *Christ Healing the Sick*. Though not a great genius, West was a talented and painstaking painter, and is given credit for improvements he made in the manner of treating historical subjects.

WEST CHES'TER, PA., the county seat of Chester County, twenty miles west of Philadelphia, on the Pennsylvania and the Philadelphia, Baltimore & Wilmington railroads. It is surrounded by an agricultural region, and large cream separator works and extensive nurseries are the most notable industries. The city is the seat of the West Chester State Normal School, one of the largest normal schools in the country, and of Darlington Seminary for young ladies and Saint Anthony's Boys' College. The Battle of the Brandywine was fought within four miles of West Chester, and the battlefields of Chadd's Ford and Valley Forge are within driving distance. The Old Turk's Head Hotel dates from pre-Revolutionary days. Population, 1910, 11,767 in 1920, 11,717, a slight decrease.

WESTERN AUSTRALIA, a state of the Australian Commonwealth, occupying all of that portion of the continent west of the 129th meridian, east longitude. Its greatest extent from north to south is 1,480 miles, and from east to west, 1,000 miles. The area is estimated at 975,920 square miles, making it the largest of the Australian states. In this vast region there are about three inhabitants to the square mile, as the population in 1921 (official census) was only 332,213. No other state of the Commonwealth is so sparsely populated.

The interior is a low plateau, varying in altitude from 700 to 1,000 feet and occasionally rising to greater height. It is mostly sterile, with little or no vegetation. Most of the eastern part of this division belongs to the great Victorian Desert. The western coast line is bordered by highlands or mountains, which are from 50 to 100 miles from the coast. These mountains also extend into the northern or Kimberley division. They are low, and their highest summits do not exceed 3,580 feet. The productive regions of the colony are in the west and southwest. Here there is sufficient rainfall to sustain vegetation, and extensive forests of eucalyptus, sandalwood and other Australian trees occur.

The lands are also well suited to grazing and agriculture, and wheat, barley, corn, oats,

potatoes and hay are raised in paying quantities. Apples, peaches, oranges, lemons, grapes and other fruits are also cultivated. Considerable live stock is raised and wool growing is an important branch of agricultural industry. Other resources of the state are timber, and mineral wealth, consisting largely of gold.

The government is similar to that of other Australian states. The governor is appointed by the British sovereign and the legislature consists of a legislative council of thirty members and an assembly of fifty members. The members of the council are chosen for six years, and of the assembly, for three years. Women vote on equal terms with men. Perth is the capital. Population in 1915, 319,859, in 1921, 332,213. See AUSTRALIA.

WESTERN RESERVE. In 1786, when Connecticut ceded to the United States government the western lands covered by its original charter of 1662, it retained a strip of land extending westward from the Pennsylvania boundary 120 miles, and called it the Western Reserve. Most of this tract was sold in 1795 and 1796 to the Connecticut Land Company, and the sum paid (\$1,200,000) was used for Connecticut public schools. The new company surveyed the land, and settlers began to take homesteads and to develop it. Later the district became a part of the state of Ohio. The name of the reservation disappeared from geography, but survives in a university at Cleveland, which is situated in the district (see below).

WESTERN RESERVE UNIVERSITY, a nonsectarian institution of higher learning, founded in 1826. It is located in Cleveland, Ohio, where it occupies a beautiful parklike campus covering thirty-six acres. The following departments are maintained: Adelbert College; Men's College; the College for Women; the Library School; the School of Applied Social Sciences; schools of dentistry and pharmacy; the Department of Graduate Instruction; graduate schools of law and medicine; the School of Education, and the summer session. The library contains 134,000 bound volumes. Including the summer school enrollment, the student body numbers about 4,000. There are about 350 members on the faculty.

WESTFIELD, MASS., a town in Hampden County surrounded by the picturesque Berkshire Hills, is nine miles west of Springfield, on the Westfield River and on the Boston &

Albany and the New York, New Haven & Hartford railroads. It is especially noted for its manufacture of whips, in which industry it is the leading city of the United States; heating apparatus, bicycles, motorcycles and cigars are also manufactured. A state normal school is located here, and the town has a Federal building, a hospital and a public library. Westfield was settled in 1642, and was known by the Indian name of Woronoco until its incorporation in 1669. Population, 1910, 16,044; in 1920, 18,604 (Federal census).

WEST INDIES, *in'diz*, or **ANTILLES**, *an til' leez*, an archipelago lying between North America and South America, and between the Gulf of Mexico and Caribbean Sea on the west and the Atlantic on the east. The islands cover a total area of about 92,000 square miles, while their surface area comprises only about 300 square miles. They are believed to be the summits of a subterranean mountain chain. Most of them are high above sea level. The climate is tropical. Cuba, the largest island of the group, is independent; Santo Domingo and Haiti, both on the same island, are self-governed states under the financial supervision of the United States. The other islands are colonial possessions, distributed among the several governments as follows.

Great Britain: Bahamas, Jamaica, Caymans, Virgin Gorda, Tortola, Anegada, Sombrero, Anguilla, Barbuda, Saint Christopher (Saint Kitts), Antigua, Nevis and Redonda, Montserrat, Dominica, Saint Lucia, Saint Vincent, Barbados, Grenada and the Grenadines, Tobago, Trinidad.

United States: Porto Rico, Saint Thomas, Saint John, Santa Cruz (Saint Croix), the last three purchased in 1917 from Denmark and now called the Virgin Islands.

France: Martinique: Guadeloupe, Désirade, Saint Martin (in part), Marie Galance, Saint Bartholomew, Les Saintes.

Netherlands: Saint Martin (in part), Saint Eustatius, Saba, Curaçao, Aruba, Buen Ayre.

Venezuela: Margarita, Tortuga, Hermanos.

Independent: Cuba and Isle of Pines, Haiti. The large islands and different groups are described under their respective titles.

Related Articles. Consult the following titles for additional information:

| | |
|-----------------|--------------------|
| Bahama Islands | Porto Rico |
| Barbados | Saint Christopher |
| Cuba | Santo Domingo |
| Dominica | Travels in Distant |
| Guadeloupe | Lands |
| Haiti | Trinidad |
| Jamaica | Virgin Islands |
| Leeward Islands | Windward Islands |
| Martinique | |

WEST INDIES, DANISH. See VIRGIN ISLANDS OF THE UNITED STATES.

WEST'INGHOUSE, GEORGE (1846-1914), an American inventor and engineer, the inventor of the air brake. He was born in Schoharie County, N. Y., and was educated in the public schools of Schenectady. He spent much time in his father's machine shop and invented, when but fifteen years of age, a rotary engine. During 1863 and 1864 he served in the Union army, and later he studied in Union College. His inventions include a device for replacing railroad cars on the track; the air brake, which he invented in 1868 and subsequently improved, and a number of signaling devices. Alternating current machinery was introduced in America largely through his efforts. He built the great generators at Niagara Falls and those for the elevated railway and the rapid transit system in New York, and he established in Europe and in the United States large works for the manufacture of air brakes and other machines. See AIR BRAKE.

WESTMINSTER ABBEY, a famous church in London, called "Abbey" because up to the time of Henry VIII it was a Benedictine monastery, presided over by an abbot. It is situated near the Thames, adjoining the Houses of Parliament. In 1065 a church was built on the site, in the Norman style, by



WESTMINSTER ABBEY

Edward the Confessor, but the main building, as it now stands, was begun in 1220 by Henry III and was practically completed by Edward I. Various additions were made down to the time of Henry VII, who built the chapel which bears his name. The upper parts of the two towers were designed by Sir Christopher Wren. The extreme length of the church is 423 feet, the roof is 102 feet high, and the towers are 225 feet. The coronation

of English kings takes place in the choir of Westminster Abbey, where the coronation stone brought by Edward I from Scotland, is placed beside the coronation chairs of the English sovereigns.

Burial in the Abbey is one of the greatest honors the nation can bestow, and not only sovereigns but some of the most celebrated men of science, soldiers, statesmen and men of letters are interred there. Some of the great men who have not been buried there are honored with tablets or portrait busts. In the *Poet's Corner* are monuments to most of England's great poets, from Chaucer to Robert Browning, and a memorial to Longfellow, the only American who is represented.

WESTMINSTER HALL, the hall of the old palace of Westminster, erected by Richard II on the foundations of a structure built by William Rufus. It is 290 feet long, sixty-eight feet wide and ninety feet high, and it has a fine porch, and a roof of carved timber which is considered the most notable of its kind. This building is closely associated with many stirring events in English History. Here Chancellor More, Lady Jane Grey, the Earl of Strafford, King Charles I and Warren Hastings were brought to trial. The hall was the center of the highest English courts of law until these were removed to the new buildings recently erected for their accommodation. It escaped the fire of 1834, and to-day serves as a vestibule to the Houses of Parliament.

WEST ORANGE, N. J. See **ORANGE**.

WESTPHALIA, *west fa' li ah*, a small province of Prussia, mountainous as to its surface, rich in iron, coal, zinc and copper. Its annual output of coal before the World War was over 53,075,000 tons, and of iron, over 1,563,700 tons. There is also a large stone and salt industry. Plants for the manufacture of metal wares and machinery abound. Westphalia also manufactures quantities of linen, woolen and cotton goods. About forty per cent of the area is under cultivation, producing crops of rye, oats, flax, potatoes and wheat. Münster is the principal city of the province.

Westphalia was retained as a part of Prussia in the formation of the new Republic of Germany. In 1923, France occupied the Ruhr district in this province, in an attempt to secure from Germany reparation payments guaranteed by treaty.

WESTPHALIA, **PEACE OF**, the treaty which closed the Thirty Years' War. Many states had been involved in this contest and two separate conventions were held to decide upon terms of peace. The representatives of the Empire, France and Spain and the Catholic electors and princes of the Empire met at Münster, and the representatives of Sweden, the Empire and the German Protestants at Osnabrück. Each of these conventions signed a treaty in 1648 and in October of that year the general treaty was signed at Westphalia, by the representatives of all the powers.

One of the important provisions of the treaty was the extension to the Calvinists of the religious liberty which had by the Peace of Augsburg been allowed only to the Lutherans. It was provided, also, that all territory which, in the Palatinate, Württemberg and Baden in 1618 and in the other states in 1624, had been held by Catholics, was to remain Catholic, and that all which at that time had been held by Protestants was to remain Protestant. A prince might make his religion compulsory with his subjects, but the latter had the right to emigrate if dissatisfied. The Upper Palatinate was added to the duchy of Bavaria; the Lower Palatinate was given to the son of the Elector Palatine, and Western Pomerania was ceded to Sweden. Brandenburg received certain cessions of territory to make up for the loss of Pomerania; France was given Alsace, with Metz, Toul and Verdun; Spain recognized the independence of the United Provinces of the Netherlands, and Austria recognized the independence of Switzerland. See **THIRTY YEARS' WAR**.

WEST POINT, N. Y., a village in Orange County, on the west bank of the Hudson, fifty-five miles north of New York City, at the opening of the Highlands. The village is beautifully situated on an elevated plateau and is chiefly noted as the seat of the United States Military Academy, which occupies a site covering 2,300 acres (see **MILITARY ACADEMY, UNITED STATES**).

In the early history of the country West Point was of considerable strategic importance, and during the Revolution it was fortified under the direction of the Polish engineer Kosciusko. It was given into the command of Benedict Arnold (see **ARNOLD, BENEDICT**), who treacherously attempted to surrender it to the British. It was selected as the site of the academy by Congress in 1802.



WEST VIRGINIA, a South Atlantic state of the American Union, lying west of Virginia, of which it was originally a part. It is irregularly oval in shape, with projections on the north and northeast. These extensions gave rise to its popular name, the *Panhandle State*. West Virginia is one of the foremost mining states, ranking next to Pennsylvania in value of mineral output.

Location and Size. The state is the only one of the South Atlantic group which has no seacoast. Its northern boundary adjoins the frontiers of Ohio, Pennsylvania and Maryland, and its curving southern boundary follows the Kentucky and Virginia borders. Ohio and Kentucky are on the west. With an area of 24,170 square miles, West Virginia is the fortieth state in size, being about 6,800 square miles smaller than South Carolina, the state next larger in area. It is almost exactly half the size of Louisiana, and about twice as large as Maryland, the forty-first state.

People and Cities. West Virginia has a remarkably high percentage of native-born inhabitants, the proportion of foreign born being less than five per cent. The total population in 1920 was 1,463,701, making the state twenty-seventh in rank. The average density per square mile was 60.9. On Jan. 1, 1910, the population was 1,121,119, according to Federal report. There are more than 86,000 of negro blood, and of the foreign groups the most prominent are Italians, Austrians, Germans, Hungarians, Russians, English, Irish and Scotch.

The Methodists are the largest religious sect. Others of importance include the Baptists, Roman Catholics, Presbyterians, Disciples of Christ and Lutherans.

According to the Federal census for 1920 there were in the state that year ten cities

with populations exceeding 10,000. The first five, in order of size, with 1920 figures, are Wheeling (56,208), Huntington (50,177), Charleston, the capital (39,608), Clarksburg (27,869) and Parkersburg (20,050).

Surface and Drainage. The surface as a whole is very uneven and in the eastern portion it is mountainous. The mountain region occupies more than one-third of the state, and the ranges extend in a northeast-southwest direction. Between the mountain ranges on the eastern and western sides are broad valleys, narrowing into ravines as they approach the hill region. The ridges in the eastern part are cut by numerous transverse valleys, and in the southern part these valleys are so numerous as to cut the mountain ranges into broad domes with spurs running in various directions, leaving but few definite ridges. The average elevation of the state, 1,500 feet, is the highest average of any state east of the Mississippi River. The highest point is Spruce Knob, in Pendleton County, which has an elevation of 4,860 feet, and the lowest point is Harper's Ferry, with an elevation of 260 feet. Some of the other prominent peaks are Bald Knob, 4,800 feet, and High Knob, 4,170 feet. West of the mountains there is a belt of broad, flat hills, ranging from 1,000 to 2,000 feet in elevation. These hills are followed by a more gently rolling country, sloping toward the Ohio River.

The Ohio River furnishes steam navigation along the whole western boundary and receives all the principal streams of the state, except the Potomac and its affluents. The largest rivers flowing into the Ohio are the Guyandotte, the Kanawha, the Little Kanawha, the Big Sandy and the Monongahela. The chief streams flowing into the Potomac are the North and South branches.

Climate. The climate is remarkably equable, with no extremes of heat or cold. The mean annual temperature at Morgantown is 54°. The average rainfall in the highest elevation is thirty-five inches, and in the lowest fifty-five inches.

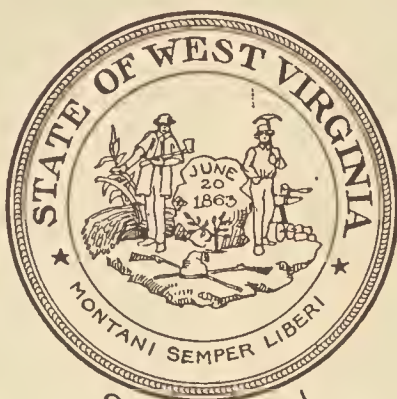
Mineral Resources. Coal, natural gas and petroleum are the most valuable mineral products of this richly-endowed commonwealth. Possessing 17,280 square miles of coal area, West Virginia surpasses Pennsylvania in extent of deposits, though the latter state has a larger annual yield. The production in West Virginia has been steadily increasing for many years, and now approxi-

WEST VIRGINIA

The Panhandle State



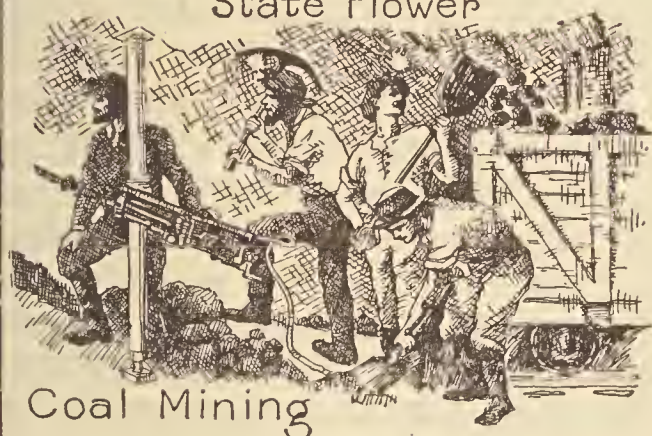
Rhododendron,
State Flower



State Seal



The Old Capitol, now Wheeling
City Hall



Coal Mining



Population of Cities

- 15,000 to 25,000
- ▲ 30,000 to 40,000
- Between 40,000 and 50,000

mates 90,000,000 tons annually, wholly of bituminous coal.

In the output of natural gas the state ranks first in the Union, with an annual yield valued at over \$45,000,000. The richest fields are in Lewis, Harrison and Ritchie counties, but there are wells in at least a score of counties. West Virginia is the sixth state in yield of petroleum, the yearly production of which is about 9,000,000 barrels. Other products found in paying quantities include clays, glass sand, marble, sandstone, limestone and salt. The total annual value of all mineral products is about \$135,000,000.

Agriculture. Considering its mountainous surface West Virginia ranks well as an agricultural state; about one-third of the whole land area is improved. The Ohio and the northeastern valleys are especially fertile. Corn is grown generally, and leads all other crops in acreage, production and value. The annual harvest is about 25,000,000 bushels. Other important crops are wheat, hay, oats, potatoes, buckwheat and rye. Sorghum cane and sugar beets also receive considerable attention, and fruits thrive in various sections, especially in the panhandle regions. Apples, including the prized Grimes' Golden variety,

are the most important orchard crop, and peaches are second. Market gardening, stock raising and dairying are all profitable lines of farm activity.

Manufacturing. West Virginia has many natural advantages conducive to the development of manufacturing, such as an abundance of fuel, water power and good transportation facilities. It ranks tenth among the states in the manufacture of lumber and lumber products, its most important manufacturing industry. Wheeling, the principal manufacturing city, is the center of the iron and steel interests, representing the second largest industry.

The state is first in the production of lamp-black, one of the first ten in the production of tanned leather articles, second in the output of galvanized iron, third in that of coke, and second in that of tin plate and terne-plate. At Wheeling and other cities there are extensive glass factories, and at Charleston there is one of the largest ax factories in the world. Oil refining, pottery making and the manufacture of tobacco products are also carried on.

Charities and Corrections. The charitable and correctional institutions include the

Items of Interest on West Virginia

One of the provisions of the state constitution makes it illegal for the commonwealth to contract debts. In July, 1916, there was a surplus in the treasury of more than \$2,323,000.

The important railway systems entering the state include the Pennsylvania, the Baltimore & Ohio, the Chesapeake & Ohio, the Norfolk & Western and the West Virginian, Central & Pittsburgh.

The Ohio and its tributaries provide some of the cheapest means of transporting coal in the world.

West Virginia assumed its share of the old state debt when it separated from Virginia, but the amount for which the state was liable was not definitely decided upon until 1915, when the United States Supreme Court placed the state's liability at \$12,393,929, with interest reckoned at \$8,178,000.

There are no lakes in the state, and the water area, 148 square miles, is smaller than the water surface of most of the states.

The large tonnage of coal, timber, and ores makes transportation of freight a profitable business, most of which is handled by the railroads, though large sums of money have been spent by the Federal government and by the state to improve river navigation.

All children between the ages of six and twenty-one are entitled to free education in the public schools, and all children between the ages of eight and fourteen are required to attend school at least twenty weeks each year.

Questions on West Virginia

What is the general shape of West Virginia?

What is its area? Population?

What is the character of the surface?

What rivers drain the state?

How does West Virginia rank in the production of coal? Petroleum? Natural Gas? Coke?

What is Blennerhassett and why is it famous?

Western State Hospital, the Spencer State Hospital, the Huntington State Hospital, the State Tuberculosis Sanatorium, the Welch State Hospital, No. 1, McKendree Hospital, No. 2, the Fairmont Hospital, No. 3, the West Virginia Industrial School for Boys, the West Virginia Industrial Home for Girls, the West Virginia School for the Deaf and Blind, the West Virginia Colored Orphans' Home, and the West Virginia Children's Home.

Transportation. The state secures water communication through the Ohio, the Monongahela, and the Kanawha, which are navigable for large boats. Lumber is floated down the Little Kanawha, Big Sandy and Guyandotte, as well as down the Ohio, which is used extensively to transport coal. Several trunk lines of railway traverse the state from east to west, one in the northern, another in the central and two in the southern section. Lines also extend north and south, connecting these in several places, and there are numerous cross-lines and spurs, so that the northern and central parts of the state are well supplied with railway facilities. There are over 3,900 miles of railroad in the state.

Government. The legislature consists of a senate and a house of delegates, the former having thirty members, and the latter, eighty-six. One-half of the senators are elected every two years, for a four-year term, and the delegates are elected for two years. The legislature meets biennially, and the session is limited to forty-five days. The executive department consists of a governor, a secretary of state, a superintendent of free schools, a treasurer and an attorney-general, each elected for four years. The courts consist of one supreme court of appeals, twenty-two circuit courts and thirty-eight courts of limited jurisdiction, together with courts of county commissioners, justices of the peace and city courts.

Education. Separate schools are maintained for white and colored pupils. The system of public instruction is in charge of a superintendent of free schools, and school attendance is compulsory for children between the ages of eight and fourteen. High school education is under the direction of a special supervisor. The higher institutions of learning include the University of West Virginia, at Morgantown; the normal schools at Athens, Fairmont, Glenville, Huntington,

Shepherdstown and West Liberty; Bethany College; West Virginia Wesleyan College; Morris Harvey College; the West Virginia Colored Institute and Bluefield Colored Institute.

History. The state of West Virginia was, until 1863, a part of the state of Virginia. (For early history, see VIRGINIA, subhead *History*.) At the outbreak of the Civil War, many of the counties in the western part of that state had Union sympathies, while the remainder wished to secede and join the Confederacy. Therefore, in June, 1861, representatives of forty counties declared independence of the state of Virginia, established a provisional government under Francis H. Pierpont, as governor, and a legislature elected representatives to Congress and adopted a constitution in April, 1862. Meantime, a "reorganized" provisional government of Virginia had given its consent to the formation of the state, and West Virginia was formally admitted June 20, 1863. It was the scene of some of the earliest fighting in the Civil War, and furnished far more than its quota to the Federal armies. After the war there was rapid development of the resources of the state and a great increase in population. It was Democratic in politics from 1872 to 1892, but it has been generally Republican since that time. Statewide prohibition went into effect July 1, 1914.

Related Articles. Consult the following titles for additional information:

CITIES

| | | |
|------------|----------------|-------------|
| Bluefield | Fairmont | Morgantown |
| Charleston | Harper's Ferry | Parkersburg |
| Clarksburg | Huntington | Wheeling |
| | Martinsburg | |

MOUNTAINS AND RIVERS

| | | |
|------------|-------------|---------|
| Alleghany | Cumberland | Ohio |
| Blue Ridge | Kanawha | Potomac |
| | Monongahela | |

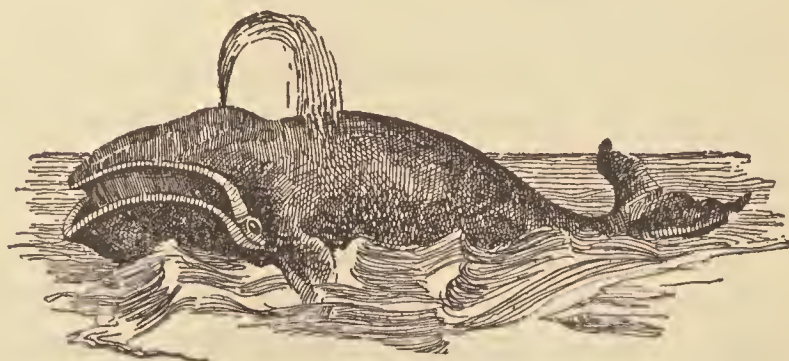
WEST VIRGINIA UNIVERSITY, a co-educational state university, established at Morgantown in 1868, by the consolidation of the West Virginia Agricultural College, Woodburn Seminary and Monongahela Academy. It includes colleges of arts and sciences, engineering and mechanic arts, agriculture, medicine and law, schools of music, military science and tactics, and commerce, and preparatory schools at Keyser, Montgomery and Morgantown. There are about 125 instructors and about 1,200 students, including those in special departments and in the summer school.

WEYLER, *way'ler*, NICOLAU VALERIANO, Marquis of Teneriffe (1838-), a Spanish

general and administrator, born at Palma, Majorca. He received a military education in Spain, and was a military attaché of the Spanish legation in the United States at the time of the Civil War. He fought in Cuba under Balmaceda, from 1868 to 1878, and later in Spain against the Carlists. Afterwards he was successively governor of the Canary and the Balearic islands, and in 1889 he became captain-general of the Philippines. After later service as provincial governor of Catalonia, Spain, he became, in 1896, Spanish governor of Cuba. His administration there was marked by such harshness and cruelty that the United States protested, and in 1897 he was recalled. After the Spanish-American War he was for a time captain-general of Madrid.

WEYMAN, *wi'man*, or *way'man*, STANLEY JOHN (1855-), an English novelist, born at Ludlow, Shropshire, and educated at Oxford. He was admitted to the bar in 1881 and practiced for eight years. His first historical romance, *The House of the Wolf*, is a story of the French occupation of Quebec. *A Gentleman of France* established his reputation in the field of historical romance; it has been translated into many languages. Among his other novels which have brought him wide popularity are *Under the Red Robe*, *My Lady Rotha*, *The Red Cockade*, *The Man in Black*, *The Castle Inn* and *The Wild Geese*.

WHALE, a large marine animal, some species of which are the largest animals in existence. Though often classed as a fish, the whale bears only a superficial resemblance to the fishes. The tapering body terminating in a finlike tail and the fin-shaped paddle on



WHALE

each side of the body are the only points of similarity, while the dissimilarities are numerous and fundamental.

The whale, first of all, is a mammal, bearing its young alive, and suckling it in infancy. It has well-developed brain and lungs, and warm blood, which circulates through veins

and arteries. Its bones, joints and muscles are like those of the higher land mammals. The forelimbs contain the same bones as do those of other mammals. These are proportionately short, and, instead of toes, there is a paddle, about seven feet long, formed by a continuous skin; while in the rear part of the body are rudimentary bones which indicate the existence of hind legs in remote ancestors. The organ of locomotion is the fin-shaped tail, which is also used for purposes of defense. The whale is a timid creature and becomes combative only when attacked. When aroused it can capsize a large vessel with its tail, which is from five to six feet long and twenty to twenty-five feet broad, and destroy smaller craft by ramming it with its blunt nose.

Two distinguishing characteristics of whales are the proportionately large head, which is usually a third of the entire length of the body, and the thick layer of fat beneath the skin, which protects the animal from the cold. This fat, called blubber, is cut from the captured animal and reduced to oil. Before mineral oils came into general use, whale oil was burned in lamps in every part of the world.

The eyes of whales are small and there is usually only one nostril, frequently S-shaped, situated on top of the head. It is closed by a pluglike valve, opened only by pressure from inside. When the whale comes to the surface it expels the air from its lungs with great force through this nostril; and the hot, moisture-laden breath condensing in the cold air produces a column of vapor several yards high. The notion that a whale takes water into its mouth and blows it out through this hole is erroneous. The whale's mouth is large, but the throat is very small; however, a species known as the Greenland whale has a throat large enough to admit a man's body.

Whales usually are divided into two classes—the whalebone whales and those having teeth. The toothless whales are commercially the more important, and are hunted for both oil and whalebone, which latter is taken from the animal's mouth. The roof of the mouth is provided with vertical horny plates, called *baleen*, about 500 in number. These plates hang from the roof of the mouth in a fringe ten or twelve feet long. This equipment serves as a sieve for straining out the minute animals on which these whales

feed. The surface waters of the ocean teem with animal life, and whales in feeding swim with open mouth at high speed near the surface, traveling in this way until hunger is satisfied. The manufacture of cheap substitutes for whalebone has greatly decreased the commercial importance of whalebone whales.

The toothed whales are the larger, attaining a length of ninety feet and a weight of seventy tons. The young when born are from ten to fourteen feet long. Of these the sperm whale is the most valuable. The blubber produces sperm oil, while the oil of the head yields spermaceti, used in making candles and cosmetics. Another valuable product of this whale is *ambergris*, found in the intestines and used in making perfumes.

Before the middle of the eighteenth century whaling was an important industry, but since the discovery of petroleum it has rapidly declined. Modern whaling operations are conducted with swift vessels, and the whales are killed by harpoons shot from guns. On every coast where whale fishing is conducted there are stations along the shore to which the carcasses are towed and cut up and prepared for market.

Related Articles. Consult the following titles for additional information, as well as the article Mammal:

| | | |
|-----------|------------|-------------|
| Ambergris | Cetacea | Sperm Whale |
| Blubber | Spermaceti | Whalebone |

WHALEBONE, *hwale'bone*, or **BALEEN'**, a term applied to the horny plates attached to the palate of the toothless whale. They are arranged in a double row on the upper jaw and hang down parallel into the cavity of the mouth. The length of the plates varies from a few inches to twelve feet, and in number there are about 200 on each side of the mouth. The color varies according to the species, some kinds being black, some yellowish-white and others gray, striped with black or black and white.

This whale has no teeth, and this fringe of bony plates serves as a sieve or strainer of the animal's food which it takes in through wide jaws while traveling at high speed. From its strength, lightness and flexibility, whalebone has become an important article of commerce, being used for many purposes, as in the manufacture of corsets, ribs for umbrellas, whips and surgical instruments, though in some of these uses it has been largely superseded by steel.

WHARTON, EDITH (1862—), whose maiden name was EDITH NEWBOLD JONES,



1, Harvesting.
2, Threshing.

WHEAT
3, Steel Elevator.
4, Interior of Flour Mill.

5, Wheat Plants.
6, Products.

is one of the most important of contemporary novelists. She was born in New York City, was privately educated, and in 1885 married Edward Wharton of Boston. She early achieved distinction as a short-story writer and in 1899 published her first novel, *The Greater Inclination*, a study in human motives. *The Touchstone*, her second novel, showed a distinct advance in the author's power of psychological analysis, a quality for which she is chiefly distinguished. With *The House of Mirth*, in 1906, she reached the height of her artistic achievement. Also notable are *The Valley of Decision*, *The Fruit of the Trees*, *Tales of Men and Ghosts*, *In Morocco* and *The Age of Innocence*.

With the exception of *Ethan Frame* and one or two others, Mrs. Wharton's stories all are of the literary and artistic world and of the world of fashion, and her characters are the highly cultivated products of those environments. Important books not mentioned above are *The Reef*, *The Custom of the Country*, *Italian Villas and Their Gardens* and *Italian Backgrounds*. During the Great War she engaged in Red Cross work in France and received two decorations. As a result of this experience she wrote *Fighting France*, and edited *The Book of the Homeless*, a book prepared and sold for the benefit of the Belgian refugees.

WHEAT, one of the most valuable and widely-known cereal crops, has constituted the staple food of civilized nations for countless centuries. It grows readily in all climates, except the hottest parts of tropical regions and the extreme cold portions of the frigid zones. However, it is best adapted to the temperate regions, and within these regions the greater part of the world's crop is produced. It requires a rich clay soil or heavy loam, and clear, bright days while it is ripening.

Wheat is supposed to be a native of Western Asia, but it has been cultivated so many centuries that the place of its origin is not fully known. It was introduced into North America in the sixteenth century.

Varieties. In accordance with their method of growth wheats are divided into *bearded* wheat and *bald* wheat. The first has glumes attached to the seeds, while the second has none. In regard to the color of the kernel, the varieties are divided into *light-colored* and *dark-colored*, or *white* and *red* wheats. Classified according to the time of planting

all wheats are grouped under *winter* wheat and *spring* wheat. In each of these classes we find hard and soft wheats. The winter wheat is planted in the fall and is harvested early the following summer. It is well suited to warm temperate climates that have mild winters. The spring wheat is planted early in spring and matures the same season. It is adapted to the short season of the cool temperate regions. It is usually a hard wheat and of better quality than any of the varieties of winter wheat.

Production. The United States is the leading wheat-producing country in the world, and the raising of this grain is carried on in Minnesota, North Dakota, South Dakota, Kansas, Oklahoma and some other states on an extensive scale. The wheat farms or ranches are large, some of them embracing more than 25,000 acres. These are divided into sections, each of which has its stables for teams, sheds for storing machinery, and other buildings, and each is under the direction of a foreman. In the spring-wheat region the land is plowed in the fall, and the wheat is planted as early in the spring as the condition of the ground will admit. In the winter-wheat section the ground is plowed as soon as possible after the crop has been harvested. The time of planting depends upon the location. In the warmest regions it is later than in the cool portions of the winter wheat belt.

The work of planting and harvesting is done by machinery. The land is prepared by plows, sometimes by gang plows, which on the largest farms are drawn by tractors. The seed is planted by drills, or sowing machines, and the grain is harvested by self-binding harvesters and thrashed by machines operated by steam engines of such capacity as to thrash from 1,200 to 1,500 bushels in a day (see THRASHING MACHINE).

The wheat is hauled directly from the thrasher to the local elevators or to cars for shipment. From the local elevators it is transported to the great wheat centers, such as Minneapolis, Duluth, Chicago and Buffalo, where it is stored in large elevators, some of which have a capacity of 6,000,000 bushels; there it is kept until needed for use.

The average production in the United States is about 880,000,000 bushels a year, though in 1915 the crop was 1,025,801,000 bushels. The leading states in the production of winter wheat are Kansas, Ohio, Oklahoma,

Indiana and Illinois. The leading spring wheat states are Minnesota, North Dakota, South Dakota, Washington and Montana.



Figures Represent Millions of Bushels

FOUR LEADERS

The figures represent the average of three years' crops.

Canada has become one of the great wheat countries of the world. In 1915 its production was 376,000,000 bushels, more than one-half of which was produced in Saskatchewan. Alberta, Manitoba and Ontario are the other important wheat producing provinces. Win-

nipeg and Port Arthur are the great wheat centers of the Dominion.



Figures Represent Millions of Bushels

COUNTRIES LEADING IN PRODUCTION

The figures represent the average of three years' crops.

At the outbreak of the World War about one-half of the world's wheat crop was produced in Europe, and Russia was next to the United States in quantity of production. Germany, France and Italy were also important wheat countries. But Europe has not for many years been able to produce all the wheat consumed by the people, and large quantities have been imported from the United States and other countries.

When the production of European countries was almost stopped by the war, the

Outline on Wheat

- I. GENERAL DESCRIPTION
 - (a) Plant as a whole
 - (b) Stalk
 - (c) Leaves
 - (d) Fruit
- II. HISTORY
 - (a) Where first cultivated
 - (b) Early cultivation in general
 - (c) Introduction into Europe and the United States
- III. Species
 - (a) Beardless
 - (b) Polish
 - (c) Spelt
- IV. PROCESSES OF PRODUCTION
 - (a) Planting
 - (b) Harvesting
 - (c) Threshing
 - (d) Milling
- V. USES
 - (a) Food for Human Beings
 - (1) Flour
 - (2) Bran
 - (3) Macaroni
 - (4) Cereals
 - (b) Other Products
 - (1) Feed for animals
 - (2) Straw
 - (3) Straw-board
 - (4) Paper

VI. MARKETS

Questions on Wheat

What is the average yearly production of wheat in the United States?

What are the other leading wheat producing countries in the world?

What proportion of the world's crop does the United States produce?

What machines are used in preparing the soil for wheat?

Who invented the harvester?

With what tool did our forefathers cut their grain?

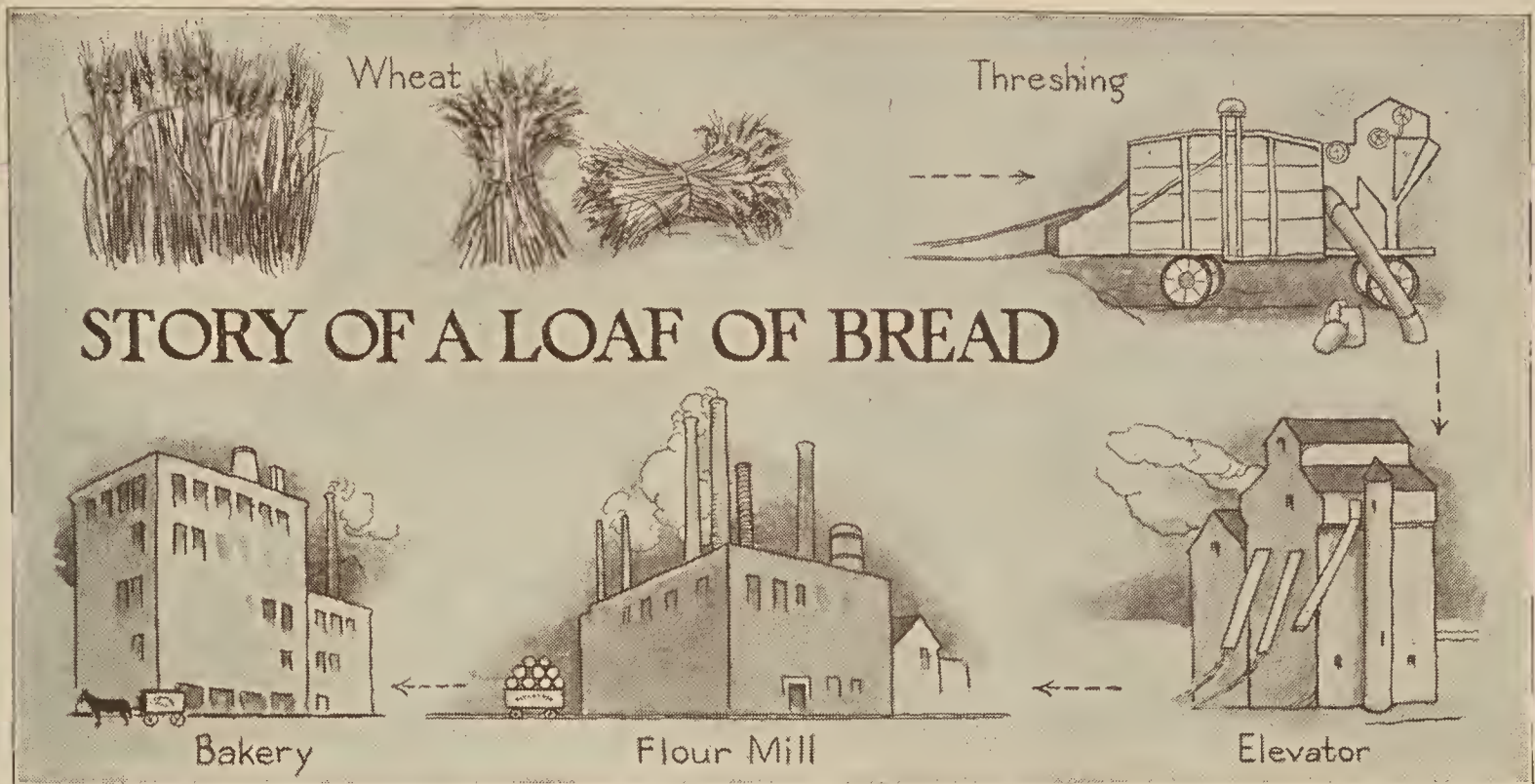
Name the different varieties of bread that you know.

Which do you consider the best? Why?

Where are the great wheat regions of Canada?

How long has wheat been known?

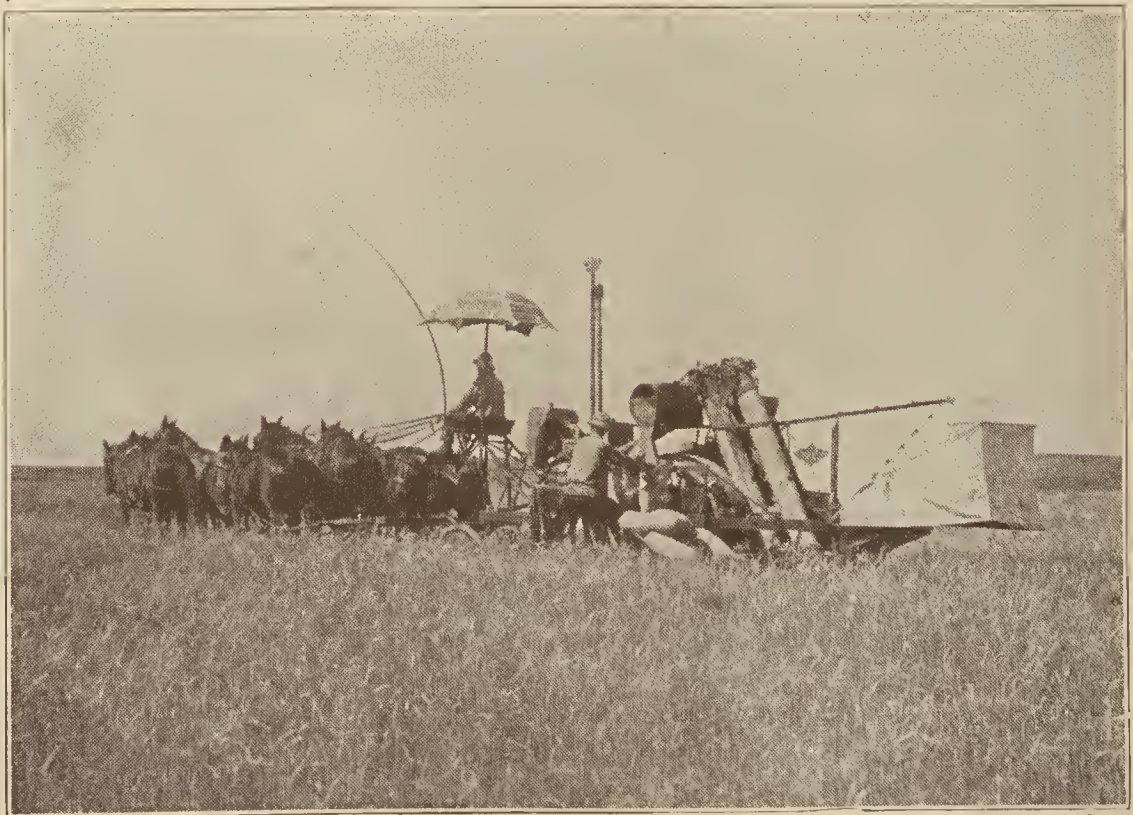
Of what region is wheat probably a native plant?



Courtesy International Harvester Co.

Tractor and gang plow preparing the soil for wheat. Wheat is the vital element in the world's food supply. In the twenty years up to 1915 the number of wheat eaters increased by 101,000,000. At this rate there will not be half enough wheat to go round in 1950 unless the yield can be greatly increased. This can be done only by taking more land for wheat growing, pushing farther into dry and cold regions, and by increasing the yield per acre everywhere.

The latest type of header, a machine which reaps, threshes, and sacks the grain from forty acres in one day. The story of the development of the reaper is full of interest. Read about Cyrus McCormick and the Reaping Machine. The inventors of agricultural machinery have done more than all governments to stimulate the very rapid increase in the world's population which has taken place in the past one hundred years.



Courtesy International Harvester Co.

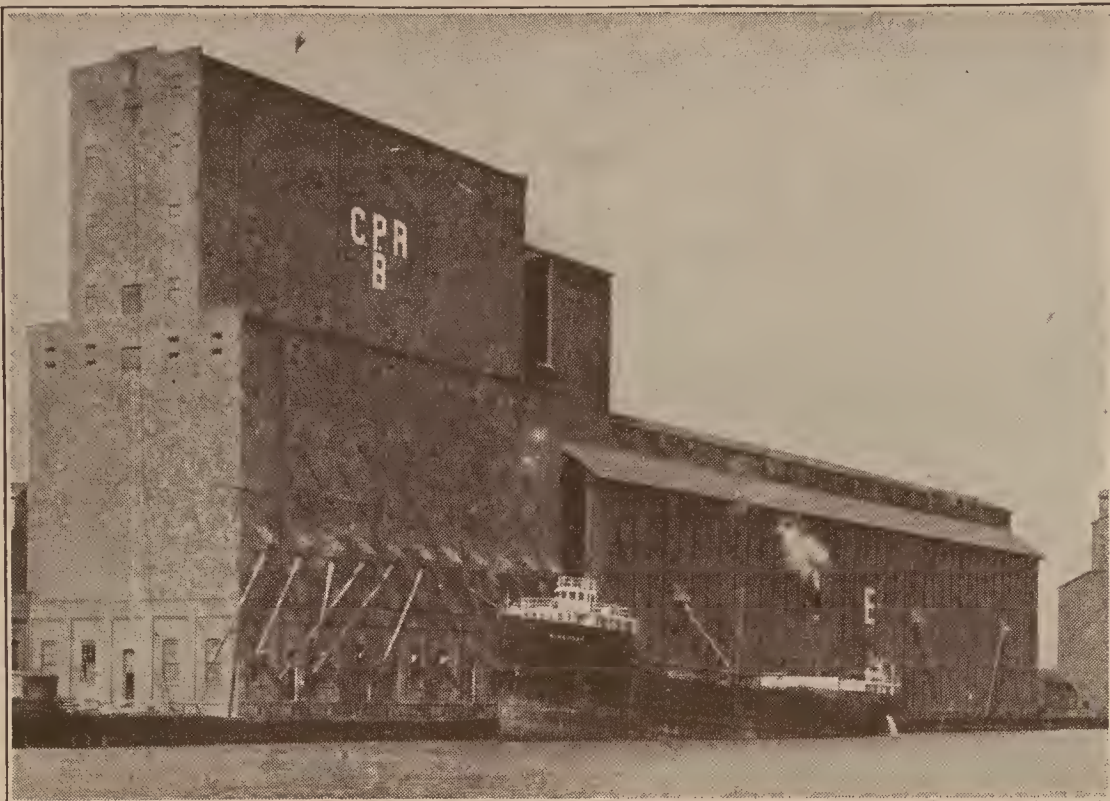


Photo from Keystone View Co., Inc.

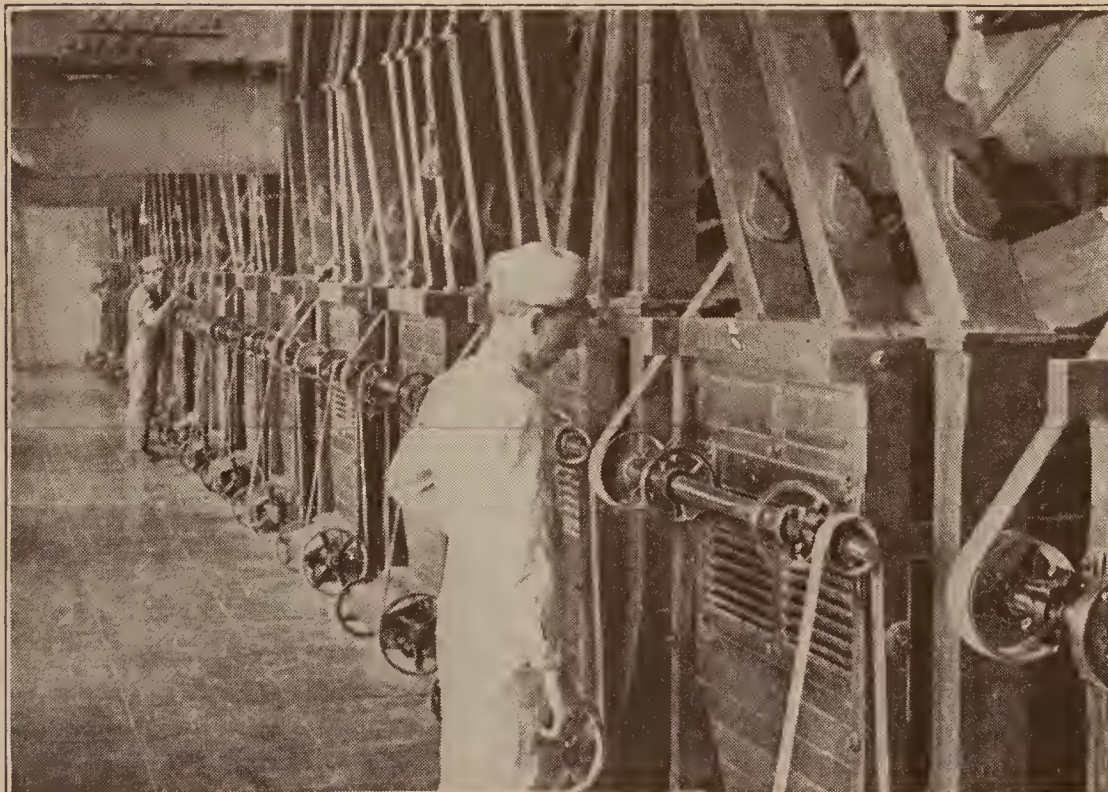
Great wheat elevators at Fort William, Ont. The faster wheat can be loaded and unloaded the more voyages a vessel can make in a year. How does this help to make bread cheaper? What is the capacity of the world's largest elevator? Read article, "Port Arthur, Ont."

One hundred thousand bushels of wheat can be loaded automatically in four hours. The steamer can then go direct to Liverpool or Manchester and be unloaded by great suction pipes in about the same time.

In early times wheat was ground into flour by hand or by horse power, and this is still done in eastern countries. What a slow and laborious process it must be to get flour as this man is doing. Note the path made as the horse walks around and around. Try to imagine our waiting for bread from flour made this way!

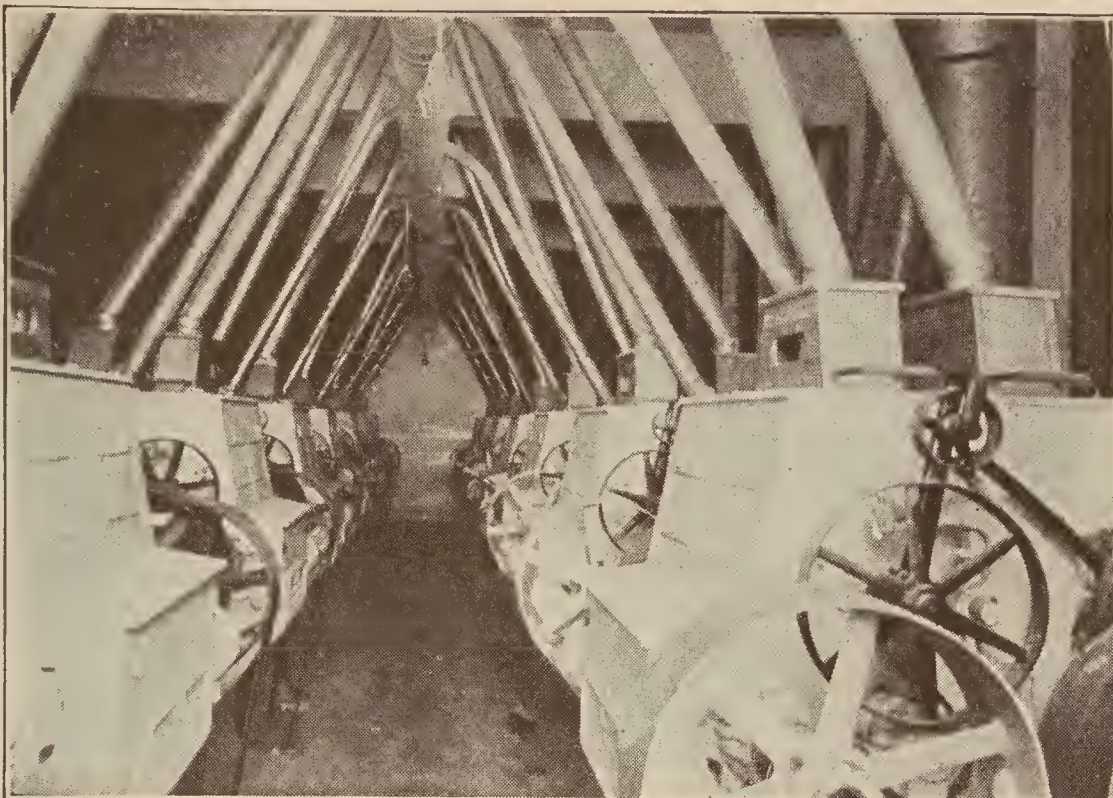


Photo from Keystone View Co.,



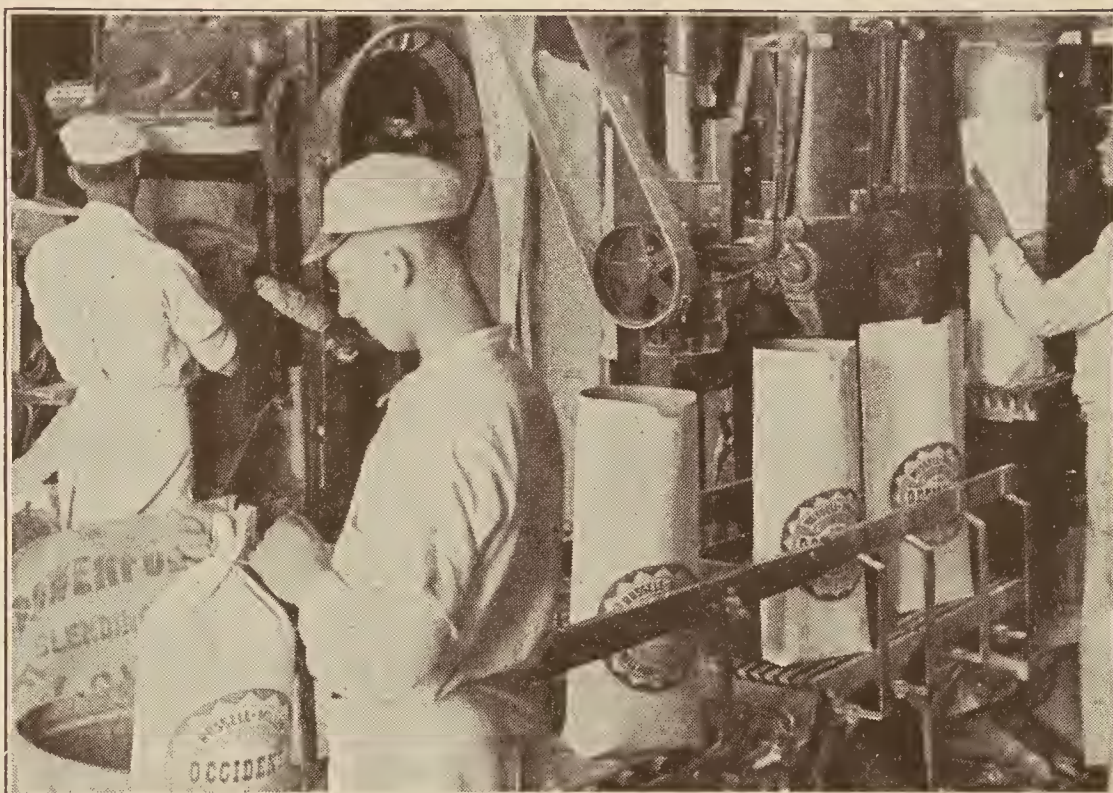
© Underwood & Underwood

The purifying room in a big flour mill in Minneapolis, the flour capital of the world. From the time the wheat reaches the top of the mill on an endless conveyor, and passes down on belts and through tubes from floor to floor, until, as barreled flour, it is rolled out into freight cars at the bottom, every effort is made to have the flour absolutely clean, for it may travel into the tropics and be kept a year or more before being made into bread. It must have good "keeping" qualities.

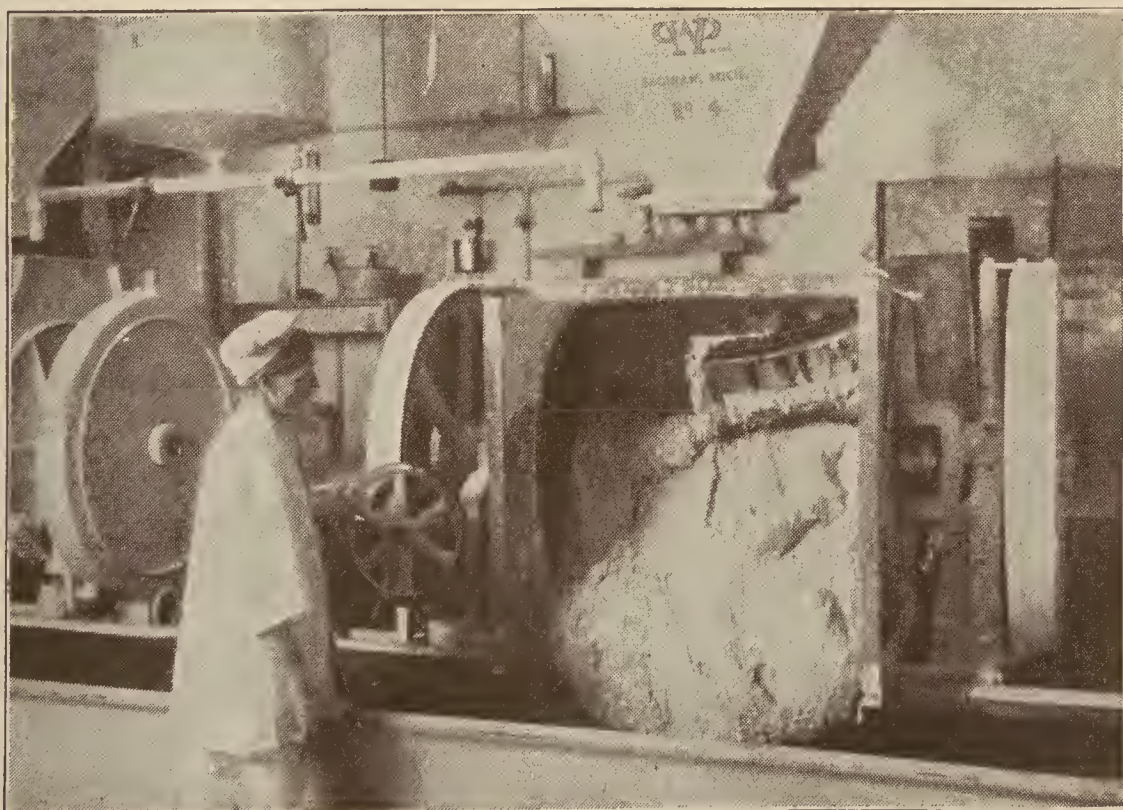


A stand of breaks where the wheat grains are broken up into the first coarse flour, to be later refined and purified. The whole process of flour making represents the triumph of machinery over hands. Every step is automatic and carefully planned for the doing of the most work in the least time with the smallest use of power.

Sacking and weighing with automatic machines in a Minneapolis mill. The machines are set so that they let down into the container (sack or barrel) only the correct amount of flour, by weight. Endless belts move the tied sacks quickly to storage rooms or to freight cars. These men have no chance to go to sleep on the job. The machines don't wait for anyone.

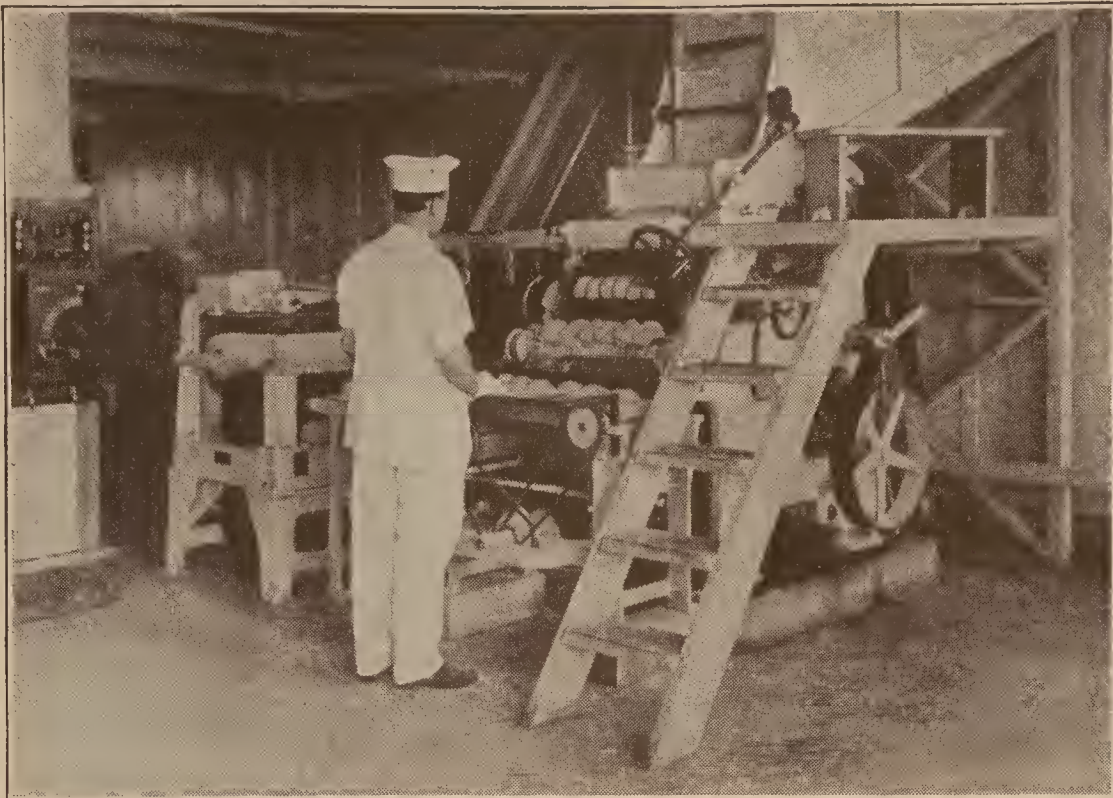


© Underwood & Underwood



Now we come to the last, or the next to last, great stage of the journey from wheat farm to your table. In the modern bakery, also, machinery does the work. A dough-kneading machine. The dough is now being run into a trough to "rise." All the bread materials, flour, yeast, water, "cream," salt, are weighed carefully and put into the machine from the floor above.

Photo from Keystone View Co., Inc.



When the dough has "risen" it is dumped down a chute to the shaping machine, which cuts the dough, puts it into the pans, and pats it into shape. In many cities there are laws to regulate the size of loaves of bread, so this machine cuts off just enough of the dough to give a loaf, when baked, of the correct weight.

© Underwood & Underwood

A peep into an automat bakery. When the noon hour comes some millions of persons rush—and rush is the word—for food. About fifty-seven varieties of "quick lunch" must be ready on the dot, for the race, the second name of which is "Hustle," can't waste much time in eating. They demand quick action. They get it. To keep hungry America good-natured the baker must be on the job both day and night.



Photo from Underwood & Underwood



How many thousands of loaves of bread do you suppose the people of New York or Montreal eat every day? In hotels, restaurants, and homes wheat bread merits its title, "The Staff of Life." Without machinery the bakers never could keep up with the appetites of busy Americans. The boast of many bakeries, "No hands have touched your bread," is true. This machine wraps the loaves.

Photo from Keystone View Co., Inc.

demand upon the United States for wheat exceeded its supply for exportation. The Food Administration restricted the sale of wheat flour in 1918 and ordered wheatless days in hotels, restaurants and homes. To encourage an increased production of wheat, the government guaranteed the farmers a price of \$2.26 a bushel for the years 1918 and 1919. Canada, Argentina and other countries were also drawn upon for the wheat they could spare for export. White wheat bread contains more nourishment per pound than any other article of food, with the exception of beans, and the scarcity of wheat caused by the war gave every one a slight idea of what a calamity a failure of the wheat crop might bring upon the race.

Uses. The greatest part of the wheat crop is manufactured into flour (which see). By-products of this manufacture include *bran*, *shorts* and *middlings*. Middlings are used extensively in the manufacture of breakfast foods, and bran and shorts are used for feed for stock. Large quantities of starch are also made from wheat. The straw is used for fodder, for bedding in stables, and in the manufacture of straw board and the cheaper grades of wrapping paper.

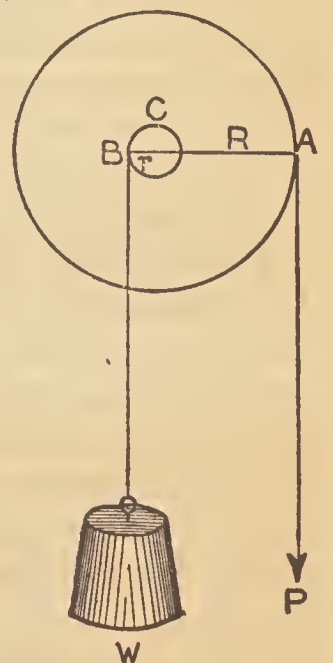
Wheat Insects. Among the enemies of wheat, those most dreaded are the chinch bug, the Hessian fly and the wheat midge, a small, yellowish insect, with a dark back, related to the Hessian fly, but differing in habits. The wheat midge, which is now common in the Mississippi Valley, probably came from Europe and has occasioned a great deal of damage to wheat, especially in warm and moist seasons. The damage is done by the little orange-yellow larvae, which destroy the embryos of the grain and prevent the heads from filling. As the larvae can live for several months without either moisture or food, they are carried about in the wheat heads, and so the species is distributed. The chinch bug and Hessian fly are described under their titles.

WHEATSTONE, CHARLES, Sir (1802-1875), an English scientist and inventor. Early in life he began the business of making musical instruments, and in his study of the scientific principle involving their construction he made important discoveries in physics. In 1834 he was appointed professor of experimental physics in King's College, London, and there he made important experiments in electricity and, in collaboration with

an investigator named Cooke, devised an electric telegraph. From this apparatus developed the system of electric telegraphs used in England until 1870. Wheatstone was also the inventor of several other electric appliances, one of which enabled a system of clocks to be regulated from a central clock, by means of electro-magnets.

WHEEL, an instrument of torture, employed by the Greeks and Romans and later in Western Europe. "Breaking on the wheel" was instituted in France in 1534 and was abolished in 1789. Assassins, highwaymen, incendiaries and pillagers of churches were of the classes so punished. There were several modes of wheel torture. Sometimes the victim's bones were broken, and his body was then bent around a wheel, bound and left until death ensued, perhaps in twenty-four hours. To terminate sooner the victim's sufferings the executioner sometimes dealt him two or three heavy blows, called *coups de grace* (mercy strokes), on the chest or stomach. In Germany the wheel was occasionally used till the nineteenth century.

WHEEL AND AXLE, a continuous lever of the first class (see **LEVER**), consisting of a wheel and axle, fastened to the same axis. The radius of the wheel is the power arm, and the radius of the axle, the weight arm, of the lever. The law of equilibrium is that the power multiplied by the radius of the wheel is equal to the weight multiplied by the radius of the axle. In the figure, *A* represents the circumference of the wheel, *C* is the circumference of the axle, *R* the radius of the wheel, and *r* the radius of the axle. If the wheel has a diameter of three feet, and the axle has a radius of one foot, a power of one pound will balance a weight of three pounds. In making the computations, the same results are obtained, whether the radius of the wheel is compared with the radius of the axle, or the diameter of the wheel with the diameter of the axle. The most common use of the wheel and axle is in the windlass, for raising water. Here the crank often takes the place of the wheel, but the device operates on the same principle.



Combinations of the wheel and axle in which toothed wheels mesh into one another and are driven by a crank or an endless band, occur in machinery where great power is required. Derricks and the shears used for cutting iron bars and plates afford good illustrations of these combinations.

WHEELER, BENJAMIN IDE (1854–), an American educator, born at Randolph, Mass. He was educated at Colby Academy and Brown University and spent four years of study in the universities of Leipzig, Heidelberg, Jena and Berlin. He taught in the Providence High School, Brown University and Harvard and in 1886 became a professor in Cornell University, holding, successively, the chairs of comparative philology and Greek.



BENJAMIN IDE
WHEELER

From 1899 to 1919 he was president of the University of California. His written works include *Analogy and the Scope of its Application in Language*, *Introduction to the Study of the History of Language* and *Principles of Language Growth*.

WHEELER, JOSEPH (1836–1906), an American soldier, born at Augusta, Ga. He was educated at the West Point Military academy, was appointed lieutenant of cavalry and served in New Mexico. When the Civil War broke out he joined the Confederate army. He was rapidly promoted, attaining the rank of lieutenant-general. He took part in the Battle of Shiloh, rendered distinguished service at Chickamauga and impeded Sherman on his march through Georgia and South Carolina. After the war he settled in Alabama, and in 1880 he was sent to Congress. He represented his district until 1898, when he reentered the United States army as major-general of volunteers to the great delight of all America, with command of the



JOSEPH WHEELER

cavalry in the Army of Santiago. He rendered valiant service in the battles of Las Guasimas and San Juan Hill, and he was senior member of the commission which arranged for the surrender of Santiago. Later he served in the Philippines, until he was retired in 1900.

WHEELER, WILLIAM ALMON (1819–1887), an American statesman, born at Malone, Franklin County, N. Y. He studied for a time at the University of Vermont, studied law in his native town and was admitted to the bar. Later he engaged in banking. He was a member of the state legislature for two terms, and in 1860 he was sent to Congress, where he served continuously until 1877. He was nominated for the Vice-Presidency by the Republican party in 1876 and was elected with President Hayes. He returned to Malone at the expiration of his term in 1881. Wheeler rendered invaluable service to his country during reconstruction days by his conciliatory attitude as chairman of the committee on Southern affairs.

WHEEL'ING, W. VA., the first city of the state, county seat of Ohio County, sixty-three miles southwest of Pittsburgh, Pa., on the Ohio River and on the Pennsylvania, the Baltimore & Ohio and the Wheeling & Lake Erie railroads. One ward of the city is built on Zane's Island in the river, the island being connected with the main part of the city by bridges, one of them a suspension bridge more than 1,000 feet long. There is water commerce in iron ore, produce, fruit, cattle and poultry. The main manufactures are steel, glass and tobacco products. The city has one of the largest electric power plants in the world. A unique feature is the Market-Auditorium, which combines an up-to-date market and a convention hall. There are a Federal building, a courthouse, a public library and four hospitals. Educational institutions include the Linsly Institute for boys and the Mount de Chantel School for girls. A normal school and Bethany College are not far distant.

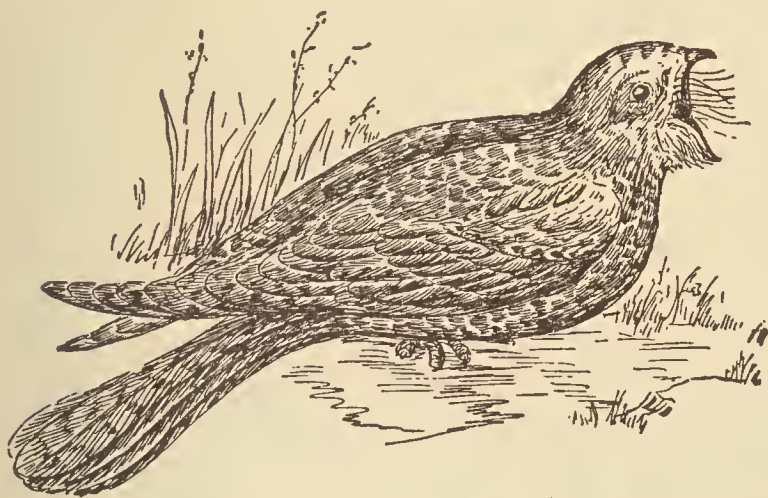
Wheeling was settled by Ebenezer Zane in 1770, and was the first town on the Ohio River. It was incorporated in 1806, and was chartered as a city in 1836. Fort Henry was built here in 1774. The people of Virginia who were opposed to secession met here in 1861 at the Wheeling Convention and established "the restored government of Virginia." The Constitutional Convention of

West Virginia also met in Wheeling, and the city was the state capital from 1863 to 1870 and from 1875 to 1885. The commission form of government was adopted in 1917. Population, 1910, 41,641; in 1920, 54,322, a gain of 31 per cent.

WHIG, in English history, the name formerly applied to the political party advocating changes in the constitution in the direction of democracy. The term is of Scottish origin, but was early brought to England, where it was used as the name of the political party opposed to the *Tories*, or government party. The term *Liberals* is now generally applied to the representatives of the party formerly known as *Whigs*.

The Whig party in the United States opposed the Democratic party from about 1835 to 1856, when the Northern wing of the Whigs was merged in the new Republican party. See **POLITICAL PARTIES IN THE UNITED STATES**.

WHIP'POORWILL, a North American bird of the goatsucker family. The name is an imitation of the bird's peculiar call of three shrill notes ending in a rising inflection.



WHIP-POOR-WILL

This weird cry is repeated many times in close succession. The whippoorwill makes its home in the midst of thick woods, rarely visiting the haunts of men. It is active at night, feeding on night insects, which it catches on the wing. During the day it sits lengthwise on a limb, where, owing to its mottled plumage, it is not easily seen.

WHIRLPOOL, *whurl'pool*, a body of turbulent water with a spiral movement due to the shape of its channel, to meeting currents or to the conflict of winds and tides. Small whirlpools occur in rivers and are caused either by the forcing of the current into a circular core in the channel or by an opening in the bank of the stream which draws the water down to a lower level. Sometimes the position of rocks and the di-

rection of currents in the sea cause large and dangerous whirlpools. The most noted of these is the Maelstrom, off the coast of Norway, and the Charybdis, near Sicily. The most celebrated river whirlpool is that of the Niagara River, below the falls.

WHIRL'WIND, a sudden and swift spiral movement of the free air of the atmosphere, either the small eddy of the city street which whirls leaves and dust and other light objects about in it, or the more extensive whirls of the deserts and plains. Very powerful whirlwinds are called cyclones or tornadoes. Whirlwinds are caused by the meeting of currents of air, or the collision of currents moving in opposite directions, and except in the case of the small eddies, they all take the same direction—counter clockwise in the northern hemisphere, and clockwise in the southern hemisphere, being governed by the vast planetary movements of the atmosphere. See **CYCLONE**; **TORNADO**.

WHIS'KY, a spirituous liquor, distilled chiefly from the fermented mash of cereal grains. There are two main varieties of whisky, called malt whisky, in which malt predominates, and grain whisky, in which unmalted grains predominate. The latter was formerly manufactured almost exclusively in the United States, rye and Indian corn being chiefly employed.

In the making of whisky several processes are necessary to convert the starch of the grain into sugar and the sugar into alcohol. The grain is ground, and the starch is cooked in a steamer for several hours to render it soluble. It is then added to the malt, and the mixture is kept at a temperature of 145° F. for about four hours. This saccharine infusion, called *wort*, is then drawn off, yeast is added, and the wort is allowed to stand from three to nine days to ferment. The liquid thus prepared for distillation is technically known as *mash*. It is placed in a metal container called a *still*, subjected to high temperature, and the vapors pass off through a spiral tube known as a *worm* and are condensed. Since September, 1917, the manufacture of whisky, except for medicinal purposes, has been prohibited in the United States.

Related Articles. Consult the following titles for additional information:
Distillation Prohibition
Malt

WHISKY INSURRECTION, the name given to a revolt against the Federal govern-

ment in Western Pennsylvania in 1794. It was the result of the excise law passed by Congress in 1791, imposing a tax on whisky. This tax was a peculiarly heavy burden to the people of Western Pennsylvania, most of whom were dependent for support largely upon the manufacture of whisky. They successfully resisted the attempts of the government to collect the tax and haughtily rejected the offer of amnesty in return for a promise of submission. Finally, in October, 1794, Washington sent 15,000 militia to the scene of the disturbance, and the insurrectionists promptly subsided. Two of the leaders were found guilty of treason, but President Washington pardoned them.

WHISKY RING, a term given in American history to a combination of distillers and Federal revenue collectors, who in Grant's administration conspired to defraud the government of the excise tax on whisky. This "ring" began operations in Saint Louis, where the revenue officers, having knowledge of technical violations of the law, blackmailed the distillers, under threats of prosecution. The decline in the revenue receipts was immediately noticeable, but all efforts at finding the conspirators failed, on account of the presence of their friends in the Treasury Department at Washington. It was only after the most thorough investigation by Benjamin H. Bristow, Secretary of the Treasury, that evidence sufficient to convict was found. The disclosures implicated the chief clerk of the Treasury Department and O. E. Babcock, President Grant's private secretary, but neither was convicted. About two hundred forty distillers and revenue officers pleaded guilty or were convicted in court, but most of the leading ones were pardoned. The total amount of which the government was defrauded was \$1,650,000.

WHIST, a well-known game at cards, first clearly described by Edmond Hoyle, in his *Short Treatise on the Game of Whist* (1743). The game is played with the full pack of fifty-two cards, by four persons, two being partners against the other two, each player receiving thirteen cards, dealt out one by one in rotation. The last card dealt is turned face up and is called the trump card; it gives a special power to the suit to which it belongs. The cards rank ace (highest), king, queen, knave, and the others rank according to their number of spots. Play is commenced by the person on the left hand

of the dealer, who lays down a card face up on the table; the other players follow in succession, with cards of the same suit, if they have them. When all have played, the player who has laid the highest card takes the four cards laid down, which constitute a trick. The winner of the trick then leads, as the first of a new trick, the winner of which becomes the leader, and so on. When a player cannot play a card of the same suit, he may play one of the trump suit and take the trick, or he may lay one of a different suit, which gives him no chance of winning the trick. When the hand is played out, the score is taken as follows: The partners who conjointly gain the majority of tricks score 1 point for every trick taken above six. The ace, king, queen and knave of the trump suit are called honors, in some systems of play, and count 1 each for the side who holds them; if one side hold three honors, they count 2 by honors, as the opposite side can have but one honor; if one side hold all the honors, 4 by honors is counted; should the honors be equally divided, neither side counts. In *long whist*, ten of these points make a game. In *short whist*, the number has been reduced to five, and in this form it is common to count by tricks alone. A rubber consists of a series of three games and is won by the side that secures two of them. In *duplicate whist* the game is played with as many sets of cards as desired. Each hand, as it is played, is laid aside, and at the close of the series of games the hands are exchanged, so that each game is played a second time, partners playing the hands of their opponents. The side that makes the greater number of points in the series wins.

Auction Whist, or **Auction**, as it is now commonly called, is a development of the game of whist, following a process of evolution, the first stage of which was known as Bridge Whist, or Bridge, now practically discarded. The game is played with a full pack of fifty-two cards, as in whist, by four persons, two being partners against the other two, and the cards having the same value as in whist. The trump suit is determined by bidding, the dealer having the first bid. Each player may bid or pass to the player on his left, as the strength of his hand warrants. The value of the suits, both for bidding and for counting in the score, is, Clubs, 6; Diamonds, 7; Hearts, 8; Spades, 9. A player may bid "No Trump," in which case

and if so played, all suits have an equal value, and each trick over six counts 10. For example, if a player bids, "one heart" indicating he is prepared to play the hand with hearts as trumps, and to make seven or more tricks, the next bidder must bid "one spade," "one no trump," these bids indicating a higher value, or "two" or more of same suit, which means a larger prospective gain than "one heart," if successful. The player making the highest bid secures the privilege of playing the hand at his choice of trump, or "no trump." The player at the left of the successful bidder (the "declarer") leads the first card, and the declarer's partner places his hand face up on the table, in view of all the players. The declarer plays the exposed hand as well as his own.

Scoring. Each trick over six (a "book") counts, with clubs, six points; with diamonds, seven points; with hearts, eight points; with spades, nine points; with no trumps, ten points. The side first scoring 30 points wins the game. Two games won out of three constitute a rubber.

| Honors | Clubs | Diamonds | Hearts | Spades | No Trumps |
|---|-------|----------|--------|--------|-----------|
| Three honors, called "Simple" | 12 | 14 | 16 | 18 | 30 |
| Four honors, in two hands | 24 | 28 | 32 | 36 | 40 |
| Four honors, in one hand | 48 | 56 | 64 | 72 | 100 |
| Four honors, in one hand and fifth in partner's | 54 | 63 | 72 | 81 | |
| Five honors, in one hand | 60 | 70 | 80 | 90 | |

Beside the point score, which determines games and rubbers, an "honor" score is kept, and is added in when the final score is reckoned up at the end of the rubber to determine the winner. The honor cards are the ace, king, queen, knave (or jack) and ten of the trump suit. If the declaration is "no trumps," the four aces are counted honors. When one side takes all 13 tricks, it makes a *grand slam*, which adds 100 points to the honor score; if 12 tricks are taken, it is a *little slam*, and adds 50 points to the honor score.

Doubling. A player may "double" the value of a trick of a declared suit. This means that the player doubling means to defeat the declarer and prevent his making the number of tricks required by his declaration. If the declarer succeeds, he counts double the usual value of each trick. If he fails to make his contract, he secures no count in his game score, and his opponents

add 50 points to their honor score for each trick on his contract that he fails to take. The declarer or his partner may in turn "redouble," and in this case the points are again doubled.

WHISTLER, *whis'tur*, JAMES ABBOTT MCNEILL (1834–1903), an American painter and etcher. He was born at Lowell, Mass., of a prominent family, his father being a distinguished engineer in the United States army. The son was sent to West Point Military Academy, but after three years of uncongenial study he turned to art. He studied in France and England, and in time established a reputation as an etcher, taking rank with the greatest of etchers, Rembrandt. He became famous also for his paintings, pastels and lithograph drawings, which were marked by a unique originality. As a draughtsman Whistler was a consummate master, but in his pictures form was subordinated to color.

Whistler called his paintings nocturnes, symphonies, arrangements. They were executed in one color tone or two related tones, always in a subdued key. His London scenes, under cover of the night or fog, Venetian sketches and studies of the sea, are expressions of poetic moods rather than representations of actual scenes. Whistler's eccentricities brought him into continual conflict with artists and critics, who learned to fear his keen wit and incisive satire.

After 1859 Whistler lived chiefly in London and was for a time president of the Royal Society of British Artists. His best-known painting is a portrait of his mother, in the Luxembourg gallery, Paris. His etchings and paintings form a part of the permanent collections of all the greatest galleries. The best collection of his work is in the National Gallery, Washington, D. C. The artist possessed an unusual gift of literary expression and wrote, among other things, *Ten O'clock*, and *The Gentle Art of Making Enemies*.

WHITE, according to the theory of color, is that color which is a combination of all the colors of the solar spectrum—violet, indigo, blue, green, yellow, orange and red. The observer watching a beam of sunlight passing through a glass prism can see these colors, and they are also beautifully apparent in the rainbow. In practical usage a pure white pigment cannot be obtained by mixing together pigments corresponding to the seven spectrum colors, for pure pigments cannot be secured. Though white is called a color,

in reality it is the presence of all colors. See **COLOR; LIGHT**.

WHITE, ANDREW DICKSON (1832-1918), an American educator, author and diplomat, born at Homer, N. Y. He was educated at Yale, the College of France and the University of Berlin. For a time he was professor of history and literature in the University of Michigan, and when Cornell University was founded he was chosen its first president. He retained the position for eighteen years, and when he resigned he bequeathed to the institution his historical library of 30,000 volumes. In recognition of this and other bequests, the departments of history and economics at Cornell were reorganized as the White School of History and Political Science.

In the course of his college presidency Dr. White rendered important service to the government. He obtained leave of absence and was United States minister to Germany from 1879 to 1881. After he severed his connection with the university, he served the government in several important diplomatic posts, as minister to Russia, as one of the commissioners to investigate the Venezuela boundary, for five years as ambassador to Germany and as president of the United States delegation to the Hague Peace Conference.

He is the author of numerous works on political and diplomatic subjects and of a large number of magazine articles. Among his most important works are *The Warfare of Science against Theology*, *Studies in General History*, *the New Germany*, *the European Schools of History*, *Chapters from My Diplomatic Life* and *Seven Great Statesmen*.

WHITE, EDWARD DOUGLASS (1845-1921), an American jurist, Chief Justice of the United States Supreme Court. He was born at Lafourche, La., educated at Mount Saint Mary's in Maryland, at the Jesuit College in New Orleans and at Georgetown (D. C.) College. He served during the Civil War in the Confederate army, after the war studied law, was admitted to the bar, entered politics and was state senator from 1874 to 1878. From the latter date until 1891 he was an associate justice of the Louisiana Supreme Court. After three years' service as United States Senator he was appointed Associate Justice of the United States Supreme Court, becoming Chief Justice in 1910, by appointment of President Taft.

WHITE, RICHARD GRANT (1821-1885), an American scholar and critic. He was educated for the law, but his literary tendencies drew him from a legal career, and his writings on Shakespeare soon made him recognized as one of the most prominent of Shakespearean scholars. Among his works are *Words and Their Uses*, *Everyday English*, *England Without and Within*, *Studies in Shakespeare*. His *Riverside Edition of Shakespeare* has had wide popularity.

WHITE, STEWART EDWARD (1873-), an American novelist, born in Grand Rapids, Mich., and educated at the University of Michigan. He spent his boyhood among the rivermen of Michigan and early acquired a liking for the forest, which he has so vividly described in *The Forest* and many of his other books. He has written many short stories, as well as several novels. Among his books are *The Blazed Trail*, *Conjuror's House*, *The Mountains*, *The Silent Places*, *The Rules of the Game*, *The Leopard Woman*, *The Forty-Niners* and *The Rose Dawn*.

WHITE, WILLIAM ALLEN (1868-), an American journalist and writer, born at Emporia, Kans., and educated at Emporia College and the University of Kansas. In 1895 he became owner and editor of the *Emporia Gazette*, which became under his management noted for the excellence of its policies and editorials, one of which, "What's the Matter with Kansas," gained wide publicity. In 1912 White served as chairman of publicity of the Progressive National Committee. He is a member of the National Institute of Arts and Letters. As a penetrating observer and critic of the times White holds a foremost position. His books are not numerous, but are of the very highest quality. Most of them are stories and sketches of life in the Middle West, and include *The Real Issue*, *The Court of Boyville*, *Stratagems and Spoils*, *In Our Town*, *A Certain Rich Man*, *God's Puppets*, *In the Heart of a Fool* and *The Martial Adventures of Henry and Me*. *The Old Order Changeth*, a review of changing conditions in American politics, is remarkable for penetrating insight.

WHITE ANT. See **TERMITES**.

WHITECAPS, in United States history, a name applied, because of the manner of their disguise, to a body of men who assumed the punishment of offenses against a community. In 1880 lawless bands in Southern Indiana undertook to control that section.

At an earlier date a band calling themselves the Knights of the Golden Circle was active in the same district. Whitecaps adopted all methods, from warning and intimidation to actual violence. The Whitecaps were not able long to continue their activities. The chief reason for the rise of such organizations is the slowness with which the law is often administered and the injustice arising therefrom.

WHITEFIELD, *whit'feeld*, GEORGE (1714-1770), an English evangelist, founder of the Calvinistic Methodists, born at Gloucester, England. At the age of eighteen he entered, as servitor, Pembroke College, Oxford. There he met the Wesleys, and became active in their organization, called derisively the "Holy Club." After his ordination as deacon he followed the Wesleys to America, but soon returned to England to raise money for an orphanage in Georgia. Subsequently he made six trips to America, preaching in Georgia, Pennsylvania, and New England. He preached in England, Scotland and Wales, and is said to have delivered 18,000 sermons. His Calvinistic doctrines separated him from the Episcopal Church and ultimately from the Wesleys, and in 1743 he founded the Calvinistic Methodist Society, which, owing to its loose organization, disintegrated after the founder's death, which occurred at Newburyport, Mass. The members joined the followers of Wesley, from which nucleus grew the denomination known as Methodists. See WESLEY.

WHITEFISH, a very important freshwater food fish of the salmon family, found in northern waters of both hemispheres. The common whitefish has an elongated body, with a hump back. The head is small and conical and the mouth toothless. Above, the color is bluish or olive, underneath, silvery. These fish live in deep water, feeding on mollusks, insects and larvae, but in the spawning season they migrate to shallow water in shoals. The common whitefish found in the Great Lakes is the most important freshwater fish in America. The yield of this fish for a single year in that country and Canada has been more than 30,000,000 pounds, valued at \$1,500,000. So important is the industry that the United States Fish Commission has taken measures to promote the propagation of these fish.

WHITE HOUSE, called also the EXECUTIVE MANSION, the residence of the President

of the United States, at Washington. It is on Pennsylvania Avenue, near several government administration buildings, and it is surrounded by a fine park. The first house on the site was occupied by President Adams in 1800. In 1814 the British army burned it, and the present building was completed in 1829. Extensive modifications have recently been made, and the building has been finished, practically according to the plans of the architect, James Hoban, who designed it in 1792. It fronts upon the Potomac, though the entrance on Pennsylvania Avenue is the one in general use. The mansion is of freestone painted white, and is built in the colonial style, with long wings and an Ionic portico. On the second floor are the private apartments of the President and his family. Below are reception rooms, including the large East Room, in which public receptions are held, the Blue Room, in which diplomats making social calls are received, the Red Room, the Green Room, the State dining room and the conservatory. An important recent addition to the building is a long wing containing the business offices of the President and his secretaries.

WHITE LEAD, a heavy white powder consisting of seventy-five per cent white lead and twenty-five per cent hydrated lead oxide. It is used extensively in the manufacture of white paint, and is prepared by several processes, that most generally employed being what is called the Dutch, or stack, process. Coils of lead are placed in the upper part of an earthen pot containing acetic acid. These pots are stacked, covered with fermenting tan bark or manure, and allowed to remain so for two or three months, in the course of which time the metal is changed to a white powder, known as white lead. In the French process a boric salt of lead is prepared, and from it boric carbonate is precipitated by means of carbon dioxide. There are several other processes, some of them electric. White lead is valuable as a pigment, because it has body and purity of color. It dries quickly and does not crack. Its poisonous quality should not be lost sight of.

WHITE MOUNTAINS, a short range of the Appalachian system, situated in the north-central part of New Hampshire, extending approximately northeast and southwest. Because of their lofty summits these mountains are called the "top of New England."

The mountains rest upon a plateau about forty-five miles long, thirty miles wide and 1,600 feet above sea level. Upon this elevation some twenty peaks rise to varying heights. Some of these are separated from one another by narrow valleys, called notches. The mountains are clustered in two groups, of which the eastern is generally known as the White Mountains, and the western, as the Franconia Mountains. These groups are separated by a tableland, varying in width from ten to twenty miles. The principal peaks in the White Mountains are in the Presidential range, so named from the names of the peaks. Of these, Mount Washington, 6,293 feet, is the highest and is also the second highest in the Appalachian system. The other important peaks are Adams, Jefferson, Clay, Monroe, Madison and Boot Spur, all of which exceed 5,000 feet, while Franklin, Pleasant, Clinton and Webster have altitudes of 4,000 feet or more. In the Franconia group the most prominent peaks are Lafayette, 5,269 feet, and Moosilauke, Liberty and Profile, all exceeding 4,000 feet. Intermingled with these prominent peaks in each group are numerous other lower mountains.

The White Mountains are traversed by the famous Crawford Notch, a narrow defile, lined with walls 2,000 feet high, through which the Saco River wends its way toward the sea. The other objects of special interest in this group of mountains are Tuckerman's Ravine, a deep gorge on the south side of Mount Washington, which is always partially filled with snow, and the summit of Mount Washington, which is reached both by carriage road and by railway, the first cog wheel railway in the world. On the summit are a hotel and a station of the United States Weather Bureau.

The principal object of interest in the Franconia Mountains is the Profile, or Old Man of the Mountains. This is a representation of the human face, formed by the projection of three rocks from the face of a nearly perpendicular cliff on the east of Cannon or Profile Mountain. One rock forms the forehead; the second, the nose and mouth, and the third, the chin. The profile is about 1,500 feet above the road from which it is seen, and it is ninety feet in length. It looks down upon a beautiful little lake known as the "Old man's wash bowl." It was an object of worship by the Indians for centuries

before it was known to white men, and it is supposed to have given Hawthorne the inspiration which enabled him to write his beautiful allegory, *The Great Stone Face*. Near by is Echo Lake, a beautiful sheet of water, so enclosed by hills that an ordinary tone of the voice is repeated five times.

The summits of the White Mountains are bare and are composed of a variety of rock known as mica schist. The reflection of the sunlight upon this rock, when seen at a distance, gives the mountains the appearance of being covered with snow; hence the name, White Mountains or White Hills. For a century these mountains have been the great playground of New England. Their bases and sides are clothed with forests, among which are many winding roads and enticing walks. Clear, rushing streams and sparkling cascades surprise the traveler at many a turn in the path, and summits easily reached afford enchanting views.

WHITE PLAINS, BATTLE OF. When Washington evacuated Long Island he moved his main force to White Plains, N. Y., on October 23, 1776. An outpost of 1,400 men was stationed on Chatterton Hill. On this outpost a British force of 4,000 made attack on October 28, routing the Americans, who withdrew to the main camp. This engagement is known as the Battle of White Plains.

WHITE RIVER, the principal tributary of the Wabash in Indiana. It is formed by the union of the East and West branches, which rise near the eastern boundary of the state and flow in a general westerly direction. The two streams unite near Petersburg, and the main stream then flows southwest for fifty miles and joins the Wabash just above Mount Carmel, Ill. On the West Fork are situated Indianapolis, the state capital, Noblesville, Anderson and Martinsville, the latter at the head of navigation. The East Fork is navigable to Rockford.

WHITE RIVER, a river of Arkansas, which rises in the northwestern part of the state, in the Ozark Mountains, where it is formed by several small streams, and flows northeastward into Missouri, returns into Arkansas and, after a general southeasterly and southerly course, enters the Mississippi fourteen miles above the mouth of the Arkansas. Its length is about 800 miles. Locks and dams make it navigable for river steamers about 480 miles. The large towns on its banks are Clarendon, Batesville and Newport.

WHITE SEA, a large arm of the Arctic Ocean, which penetrates Northern Russia to a distance of about 500 miles. The width ranges from thirty-five to 150 miles. It is broad at the northern entrance, but near its middle it narrows to a strait. Below this it spreads out in three large branches—Kandalak Bay, in the northwest, and Onega and Dwina bays, in the southeast. The chief rivers flowing into it are the Onega, the Dwina and the Mezen. Onega and Archangel are the principal ports. This sea is ice-bound from September to June, but it has a brisk summer trade, being connected by canals with the Baltic and with the Black and Caspian seas.

WHITLOCK, BRAND (1869–), an American diplomat, municipal reformer and writer. He was born at Urbana, Ohio, and was privately educated there. In his early years he had much experience as a newspaper reporter in Toledo, Ohio, and Chicago, Ill. He studied law, and in 1897 established a successful practice in Toledo. His books describing corruption in politics and injustice in business attracted much attention. In 1905 he was elected mayor of Toledo and three times thereafter, but declined a fifth nomination. In 1913 he was appointed by President Wilson United States minister to Belgium, and in that position gained the admiration of the world at the beginning of the World War through the tact, energy and efficiency shown in handling the difficult situation. In 1919 his post was raised to the rank of ambassador. His writings include *The Happy Average*, *Her Infinite Variety*, *The Fall Guy*, a volume of short stories, *On the Enforcement of Law in Cities*, *The Turn of the Balance*, *The Gold Brick*, *Abraham Lincoln*, a biography, *Forty Years of It*, an autobiography. In 1918 he published *Memories of Belgium Under the German Occupation*. After publication in a leading magazine during the year 1919 the story was published in book form under the title *Belgium* (1920).

WHITMAN, MARCUS (1802–1847), an American physician and missionary, born at Rushville, N. Y. He studied medicine at the Berkshire Medical Institution at Pittsfield, Mass., practiced four years in Canada, and in 1836 was sent by the American Board of Commissioners for Foreign Missions to explore the Oregon country and preach to the Indians. With his wife and two other

missionaries he crossed the Rocky Mountains in 1836, taking the first wagon over the mountains. Other missionaries followed. Dissensions among them led the Board to withdraw its support; Whitman journeyed from the settlement, near the site of Walla Walla, to Boston, traveling much of the way on foot, and prevailed upon the Board to alter its decision. Whitman, his wife and twelve companions were murdered by Indians in 1847.

WHITMAN, WALT (1819–1892), an American poet, born at West Hills, Long Island, N. Y. He left the public schools of Brooklyn at the age of thirteen and applied himself to his father's trade, that of carpenter. Later he worked as a printer, school teacher and as general writer for the press. In these early years, as later, he sought with characteristic democracy the society of working men, and had many friends among them. During the Civil War he gave splendid service in the hospitals of Virginia and Washington, and permanently injured his health. At the close of the war he became a clerk in the Interior and Treasury departments at Washington, remaining until 1874, when a stroke of paralysis compelled him to resign.

In 1855 the first edition of his *Leaves of Grass* had been issued, and much of his later life was given up to the enlargement of this originally small volume. Whitman's avowed purpose was to be the prophet of democracy and of the common brotherhood of man. In his desire to free himself from all traditional trammels and to achieve naturalism, he often becomes tiresome. Though his work shocks many lovers of poetry by its lack of rhyme and rhythm, among discriminating critics it takes high rank, and it is becoming increasingly popular, not only among American readers, but also in Europe.

WHITNEY, ELI (1765–1825), an American inventor, famous as the originator of the cotton gin. He was born at Westborough, Mass., and was educated at Yale College. After graduation he went to Georgia as a teacher; later he took up the study of law. His leisure moments he often employed inventing useful devices, and, learning that the cotton industry was hampered by the difficult work of separating the cotton fiber from the seeds by hand, he set to work to invent a remedy. He labored under great disadvantage, for he had to make his own tools, but in time he produced a machine which would seed a thousand pounds in

the same time that five could be seeded by hand.

At this juncture his workshop was broken into, and his apparatus was stolen before he could secure a patent. However, he and a man named Miller formed a partnership, and in 1793 they went to Connecticut to manufacture cotton gins; but the lawsuits in defense of Whitney's rights took all his profits, besides \$50,000 voted him by the state of South Carolina. Finally, in 1798, Whitney turned his attention to the



ELI WHITNEY

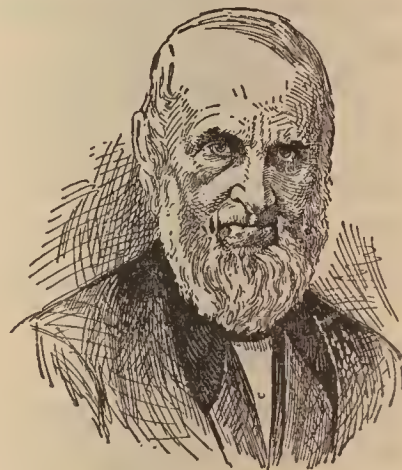
manufacture of firearms; he established a factory at Whitneyville, Conn., received large orders from the government and amassed a fortune. From his invention of the cotton gin, one of the most important of the whole series of inventions connected with the cotton industry, he reaped only belated fame. See COTTON GIN.

WHITNEY, JAMES PLINY, Sir (1843-1914), a Canadian statesman, born at Williamsburg, Ont., and educated at the Cornwall grammar school. He began the practice of law in 1876, and in 1890 was appointed queen's counsel. He was first elected to the legislature of Ontario in 1888, and was returned at each election up to and including that of 1908. In 1896 he was chosen leader of the opposition, and in 1905 was called upon to form a new government. In this he became the Prime Minister and assumed the office of Attorney-General. Later he relinquished the latter portfolio and became President of the Council. The honor of knighthood was conferred upon him by H. R. H. the Prince of Wales, in 1908, on the occasion of the celebration of the Quebec Tercentenary. He continued as Premier until his death.

WHITNEY, MOUNT, the highest peak in the United States proper, situated in the southern part of the California Sierra Nevadas. Its altitude is 14,502 feet, and its eastern slope rises steeply to a height of nearly 11,000 feet. Mount Whitney was named in honor of the noted geologist, Josiah Dwight Whitney.

WHITTIER, JOHN GREENLEAF (1807-1892), one of the foremost American poets. He was born near the town of Haverhill, Mass., Dec. 17, 1807. His parents were Quakers, who were always anxious to advance the interests of their children. The farm house was not far from the Merrimac River and near it was the brook whose "liquid lip" was companionship to them.

The young Whittier worked on his father's farm and learned the shoemaker's trade. He had little early education, except a few terms in the district school, and the wider training he received from his father and mother. Of books he had few and those not the best adapted to a child. The Bible, however, was thoroughly studied and its literary treasures fully appreciated. A volume of Burns fell into his hand and gave him the poetic inspiration. At the age of



JOHN GREENLEAF WHITTIER

eighteen Whittier began writing for the press. One of his poems which appeared in the *Newburyport Free Press* attracted the attention of William Lloyd Garrison, its editor. Garrison visited the young poet at his home and induced him to give his pen and his life to the cause of freedom. This was the beginning of a life-long friendship. Garrison urged Whittier to obtain a better education, and assisted him in securing it.

Although Whittier had had comparatively little schooling, he had read widely and was well fitted to become, as he did, the chief poet of the abolition movement. In 1835 and 1836 he was a member of the legislature of Massachusetts, but ill health compelled him to resign and give up also the editorship of a paper which he was managing. In 1836 he moved to Amesbury, and some years later he went to Philadelphia, where he edited the *Pennsylvania Freeman*, an anti-slavery paper, the office of which was burned by a mob after he had been at work on it but four days. This did not compel Whittier, however, to give up the work, which he continued for two years. After his return to Amesbury, his poems on freedom continued to appear, and in 1843 a volume of ballads was published. Among his notable poems of these

years, which appeared in *The National Era*, the *New England Magazine* and the *Atlantic Monthly*, were *Songs of Labor*, *Maud Muller* and *Barbara Frietchie*. *Snowbound*, published in 1865, brought great increase to Whittier's popularity and also an improvement in his worldly circumstances. He had no family, however, and most of his money was spent in charity. He died while on a visit to Hampton Falls, N. H.

Whittier's poems on slavery were too thoroughly inspired by the occasion for which they were written, too much given over to argument on this subject, to be permanently great poetry, but their energy and sincerity made them most effective aids toward the ends to which they were directed. Among his other poems, *The Barefoot Boy*, *Telling the Bees*, *Snowbound* and *Among the Hills* are most notable. They have a homely truth to life, a fineness of sentiment, a freshness and a quiet power which will make them live.

WHOOPING COUGH, *hoop'ing kof*, a contagious disease that frequently becomes epidemic and usually affects children only, though adults may have it. It begins with the symptoms of a severe cold, which after a week or ten days develops into a peculiar cough, that ends with a whoop, caused by a forcible indrawing of the breath. These coughing paroxysms occur at rather short intervals, but between the paroxysms the person feels reasonably well and after three or four weeks the attacks occur less frequently. Within two months they disappear entirely. The cause of the disease is not thoroughly understood. It is not usually attended with fatality, except where other complications, such as pneumonia and bronchitis, set in. A child suspected of having whooping cough should be kept from other children, for the disease is highly contagious. The patient should have nourishing food and live in the open air as much as possible. The sleeping room should be well ventilated, and whenever possible it is wise to sleep on a porch or in a tent.

WICHITA, *wich'i taw*, KAN., the county seat of Sedgwick County, 157 miles southwest of Topeka, on the Arkansas River and on the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, the Frisco, the Missouri Pacific, the Mexico & Orient and the Midland Valley railroads. It is the center of an agricultural and stock raising district, and there is an extensive trade in cattle,

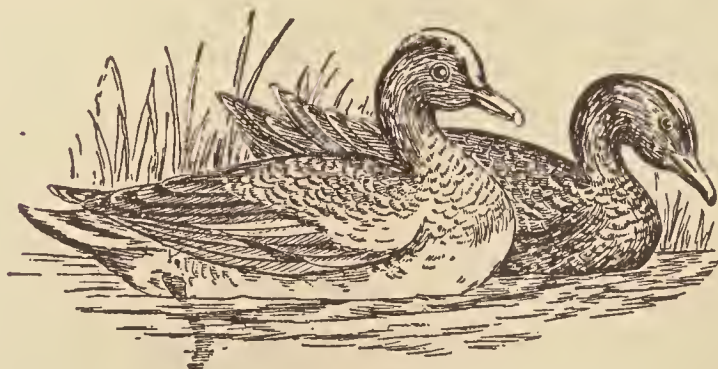
pork, horses and mules, poultry, lumber, flour and alfalfa. Wichita is one of the largest broom corn markets in the world. Manufacturing establishments are extensive, and oil and gas wells are being rapidly developed in the vicinity. The educational institutions of established rank are Fairmount College, Friend's University and Lewis Academy. Notable buildings are the Forum, with a seating capacity of 8,000, the state Masonic Home and a Carnegie Library. There are several hospitals and children's homes. Wichita was settled by Indian traders in 1869 and named after the Wichita tribe. It was chartered as a city in 1872. In 1909 it adopted the commission form of government, and in 1917 the city manager form. Population, 1910, 52,450; in 1920, 72,128, a gain of 38 per cent.

WICHITA FALLS, TEX., the county seat of Wichita County, 114 miles northwest of Fort Worth, on the Wichita River and on the Fort Worth & Denver City, the Missouri, Kansas & Texas, the Wichita Falls & Northwestern and the Wichita Valley railroads. It is an important manufacturing center, having flour mills, elevators, an oil refinery, brick yards, and manufactories of automobile trucks, window glass, glass jars, brooms, stores, pottery and candy. Educational institutions include an academy, a business college and a college of music and art. Wichita Falls was settled in 1882, and was incorporated as a city in 1884. Population, 1910, 8,200; in 1920, 40,079.

WIC'LIF, JOHN. See WYCLIFFE, JOHN.

WIC'OPY, or **MOOSEWOOD**. See LEATHERWOOD.

WIDGEON, *wij'un*, a wild duck found in both Europe and America. The American widgeon, which is most abundant in the



WIDGEONS

South, is often called the *bald pate*, from the white on the top of its head. It spends the winters in Central and South America and nests in Canada. The eggs, from seven to

twelve in number, are buff-white. Widgeons are notorious for their trick of robbing canvasbacks and other diving ducks of the plant food picked from the beds of streams, by snatching it from their bills as they come out of the water.

WIESBADEN, *vees'bah den*, PRUSSIA, a celebrated watering place situated in the valley of the Salzbach, about two miles from the Rhine and six miles northwest of Mainz. The town has a beautiful location among densely-wooded hills, that protect it from cold winds. Mineral springs abound. It is purely a residence town, with no industries of importance. There are a number of churches of historic interest, a museum, a picture gallery, a public library, agricultural and industrial schools and an institution for the blind. Population, 1910, 109,002.

WIG'GIN, KATE DOUGLAS. See RIGGS, KATE DOUGLAS WIGGIN.

WIGHT, *wite*, ISLE OF. See ISLE OF WIGHT.

WIG'WAM, the conical tent of the American Indian. To make it he drives several saplings into the ground in a circle and fastens them together at the top. This framework he covers with grass matting or birch bark, leaving an opening at the top for the escape of smoke. A small opening in the side—always the side of the rising sun—serves as a door. This is ordinarily covered with a flapping deer-skin curtain.

WILBERFORCE, *wil'bur fohrs*, SAMUEL (1805–1873), an English clergyman, third son of William Wilberforce (see below), was born at Clapham. He was graduated from Oriel College in 1826 and two years later was ordained. He was successively curate of Checkendon church; rector of Brightstone, Isle of Wight; archdeacon of Surrey; rector of Alverstoke and canon of Winchester; chaplain to the prince, a position gained through an anti-slavery speech; dean of Westminster and bishop of Oxford, where he remained twenty-four years. Wilberforce, by his cleverness and persuasive power, was able to cope with the difficult situation in the Church at the culmination of the Oxford Movement, when many of the High Church party went over to the Roman Catholic Church. Among his writings are *Letters and Journals of Henry Martyn*, *Agathos*, *Rocky Island* and *History of the American Church*.

WILBERFORCE, WILLIAM (1759–1833), an English statesman and philanthropist, born at Hull, in Yorkshire. After completing his education at Saint John's College, Cambridge, in 1780 he was elected member of Parliament. In 1792 he succeeded in getting a bill for the gradual abolition of slavery through the House of Commons, but it was rejected by the House of Lords. Year after year he pressed this measure, and in 1807 it was passed, during the administration of Fox. His efforts finally resulted (1833) in a bill which abolished slavery in the British colonies. He was a man of remarkable versatility and personal attractiveness.

WIL'BUR, CURTIS DWIGHT (1867–), an American lawyer and jurist. He was born in Iowa, and graduated from the Naval Academy at Annapolis in 1888. He resigned from the navy soon afterwards and began the practice of law in Los Angeles, where he served the city and county as attorney and county judge for many years. In 1918 he was elected to the Bench of the Supreme Court of California, in time becoming Chief Justice, a position which he relinquished early in 1924 to accept the post of Secretary of Navy, tendered him by President Coolidge.

WIL'COX, ELLA WHEELER (1855–1919), an American poet and essayist. She was born in Wisconsin, was educated at the University of Wisconsin and was married in 1884 to Robert M. Wilcox. From her girlhood she contributed freely to newspapers and magazines, and some of her writings have acquired considerable popularity. Her volumes of verse include *Poems of Pleasure*, *Poems of Passion*, *Poems of Power and Maurine*.

WILD CAT, or **CAT'AMOUNT**, a wild animal belonging to the same family as the domestic cat, but of larger size than the latter.



WILD CAT

The European wild cat once common, but now seen only in the most isolated regions, has a very long body and legs and a short, thick tail. Its fur is yellowish-gray, with

a dark marking down the back and other dark stripes on the sides and rings on the tail. In the United States the name is often applied to the lynx (which see).

WILDCAT BANKS, unstable banking institutions under loose state control, whose reckless issue of notes, followed by inability to redeem the same, were responsible for a series of financial panics in the United States in the generation preceding the Civil War. The most disastrous of these panics was that of 1837. President Jackson having removed the government deposits from the United States Bank and placed them in state banks, wildcat banks sprang up like mushrooms. Alarmed by the subsequent wild speculation, the President sought to correct the evil by ordering, through his famous "Specie Circular," that only gold and silver be received in payment for public lands. This precipitated a crash, and large numbers of wildcat banks failed. See JACKSON, ANDREW.

WILDE, OSCAR FINGAL O'FLAHERTIE WILLS (1856-1900), dramatist, essayist and novelist, was born at Dublin, Ireland, the son of a noted surgeon. After graduation from Oxford, where he won honors in literature, he went to live in London and became leader of a so-called aesthetic movement. His affectation of long hair, velvet knee breeches and a languishing air furnished a theme for much witty satire. He was lampooned by Du Maurier in *Punch* and by Gilbert in his opera *Patience*.

In 1881 Wilde published a volume of poems, and in 1888 a collection of fairy stories called *The Happy Prince and Other Tales*. These won high praise. Then appeared *The Picture of Dorian Gray*, a novel; *Intentions*, a volume of essays, and the plays *Lady Windermere's Fan*, *A Woman of No Importance*, *The Ideal Husband* and *The Importance of Being in Earnest*. His drama *Salome* has been set to music by Richard Strauss. In 1895 Wilde was convicted of a serious offense against morality, and was condemned to two years' penal servitude. In prison he wrote *A Ballad of Reading Gaol*, a poem of much force, and *De Profundis*. His last years were spent in seclusion on the Continent.

WIL'DERNESS, BATTLE OF THE, the first important battle of Grant's famous Virginia campaign in 1864, between a force of 120,000 men under General Meade, supported by Warren, Sedgwick and Hancock, and with

General Grant in supreme command, and the Army of Northern Virginia, under Lee, comprising about 62,000 men under Ewell, Hill and Longstreet. The Federals were encamped on the northern bank of the Rapidan River, near Culpepper Court House, while the Confederates were south of the river, on the edge of the Wilderness, where Lee had completely baffled Hooker's army after the Battle of Chancellorsville. Grant began crossing the river on May 3, without a contest, Lee being confident that he could defeat the Federals when they had once become entangled in the Wilderness, a dense forest with thick underbrush. In the morning of May 5, General Warren, who was in the van of the Federal force, was met by General Ewell, and an all-day battle resulted, with little advantage to either contestant. Grant at first believed that he was confronting only a part of Lee's army, but soon ordered Hancock to come up from Chancellorsville. Upon his arrival, he confronted General Hill, and another severe battle ensued, which paused at nightfall, only to recommence at dawn. It ended in a drawn battle; Grant had failed to make progress toward Richmond; Lee had failed to crush the opposing army. The losses of the Union forces were about 18,000; of the Confederates, from 10,000 to 12,000. See CIVIL WAR IN AMERICA.

WILHELMINA, *vil hel me'nah*, (1880-), queen of the Netherlands, born at The Hague. In 1890, on the death of her father, William III, she succeeded to the throne, her mother, who was the daughter of Prince George Victor of Naldeck, serving as regent until 1898. Wilhelmina was married in 1901 to Henry Frederick, Duke of Mecklenburg-Schwerin. Her daughter, Juliana, heiress to the throne, was born in 1909.

The general unrest in Europe which followed the World War threatened the stability of her throne for a time in 1919, but she had always held the deep love of her subjects and was able to overcome the socialist tendency of the minority.



QUEEN
WILHELMINA

WILKES, *wilks*, CHARLES (1798-1877), an American naval officer and explorer, born in New York City. He was educated in the common schools, entered the United States navy in 1818 and became a lieutenant in 1826. In 1838, in charge of an expedition authorized by Congress to explore the Southern Ocean, he visited many important places in the southern hemisphere, including the Philippine Islands, Hawaiian Islands, New Zealand, the Samoan and Fiji groups and many parts of South America. The mass of valuable scientific information collected on his voyages was published in several volumes. Wilkes was made a commander in 1843 and became a captain in 1855. Upon the outbreak of the Civil War he was given command of the frigate *San Jacinto*. On November 8, 1861, he overtook the English mail steamer *Trent* and arrested Mason and Slidell, the Confederate commissioners (see TRENT AFFAIR.) He was retired in 1864, and became rear-admiral in 1866.

WILKESBARRE, *wilks'bair re*, PA., the county seat of Luzerne County, 145 miles northwest of Philadelphia, on the north branch of the Susquehanna River, and on the Pennsylvania, the Lehigh Valley, the Central of New Jersey, the Delaware & Hudson, the Lackawanna & Wyoming Valley, the New York, Susquehanna & Western, and the Wilkes-Barre and Hazleton railroads. The city is unique in that it is surrounded by thirty-three municipalities, of which it is the exact center, all located in an area less in extent than that covered by the city of Des Moines. It is the retail trading center for this entire group of towns, which have an aggregate population of about 250,000. There is a population of a million and a half within a radius of fifty miles.

The city is in the heart of the anthracite region of the Wyoming Valley, the coal output of Luzerne County being greater in annual value than the entire gold production of the United States, exclusive of Alaska. Mining is the principal industry, but the abundance of fuel has made the city an important manufacturing center. The silk and lace mills are the oldest and among the largest in the United States, and there are besides manufactories of locomotives, axles and springs, wire rope, adding machines, automobiles, cutlery, flour and clothing.

The educational institutions include the Harry Hillman Academy for boys, the

Wilkesbarre Institute for girls and several Catholic schools. The well-known Wyoming Seminary is at Kingston, just across the river. The Boys' Industrial Association is a unique institution, of an educational and social nature. The Osterhaut Free Library has more than 40,000 volumes, and the Wyoming Historical and Geological Society has a reference library and a notable collection of Indian relics and geological specimens and fossils. There are homes for children and aged women and several well-equipped hospitals. Important buildings are a Federal building, a courthouse, a city hall, an armory, a Grand Army hall, a Y. M. C. A., and the Irem Temple, built in Moorish style.

The city was first settled in 1769 by families from Connecticut. It was named in honor of John Wilkes and Isaac Barré, members of the British Parliament who advocated the cause of the colonists before and during the Revolution. In 1784, during the controversy between Pennsylvania and Connecticut over the sovereignty of the Wyoming Valley, the settlement was burned. The Wyoming Monument marks the site of the conflict of the Americans with the loyalists and Indians, July 3, 1778. Wilkesbarre was made the county seat in 1786 and was incorporated as a borough in 1806. After the Civil War it grew rapidly and was chartered as a city in 1871. The commission form of government was adopted in 1903. Population, 1910, 67,105; in 1920, 73,828, a gain of 10 per cent.

WILKIE, DAVID, Sir (1785-1841), a celebrated Scottish painter. He received his early art training at the Trustee's Academy, Edinburgh, and entered the schools of the Royal Academy, London, in 1805. His first works were scenes from every-day life, in which he showed the influence of the Dutch masters. In his later work, after his visits to Italy and Spain, he showed the influence of Titian and Velasquez and changed his theme to historical and portrait subjects. In 1811 he was made a member of the Royal Academy. Among his pictures are the *Blind Fiddler*, *Rent Day*, *The Village Festival*, *Penny Wedding*, *Cotter's Saturday Night*, *Duncan Gray*, *Blind Man's Buff*, *John Knox preaching before the Lords of the Congregation* and *Wellington Writing a Dispatch*.

WILKINS, MARY ELEANOR. See FREEMAN, MARY E. WILKINS.

WILL, that mental activity which gives a human being power of choice and action. Desire or feeling lies at the foundation of will, and the two are so interwoven that they cannot be separated.

Development of the Will. A complete act of will includes four successive steps—impulse, desire, choice and action.

Impulse. In the infant, will exists only as a possibility. The first actions of a young child are impulsive and instinctive, and are impelled without thought or purpose; yet it is from such actions that will is developed. Every idea contains a motor element. This is readily seen in the motor effect of such ideas as that of a worm or of a mountain. The idea *worm*, when entertained, causes one to cast the eye downward; the idea *mountain* causes one to look upward. One seldom thinks of this element in ideas, but self-examination soon reveals it. It is from this motor element that impulse arises. The child, from watching others, soon learns to imitate their actions. At first these imitations are impulsive, but when the impulse has been repeated a number of times it leads to a wish on the part of the child to perform the act.

Desire. This wish is a *desire*, which has been developed from the impulse and is now directed to a definite end. The accomplishment of this desire calls for voluntary action, hence the will is brought into play. But the mind often entertains two or more desires at the same time, and these may be so related as to oppose each other. This is readily illustrated in the case of a child who is at play with a toy in which he is interested. On the table in the room is an apple which he desires. He cannot obtain this without climbing upon a chair. While he desires the apple, he also desires to continue playing with the toy. He may have been told that he must not climb upon chairs, and, possibly, that he must not touch the apple. He desires to obey his mother's command, but he also desires the apple. This he cannot obtain, without disobeying his mother and leaving his toy.

Choice and Action. The child's desires are in conflict, and this leads to *deliberation*, another step in the development of will. He weighs his desires: Shall he continue playing with his toy, or shall he get the apple? During the deliberation he hesitates. He finally decides to get the apple, and with the acceptance of this desire, the

others are dropped. In making this decision comes *choice*, the third step in an act of will. The desire which was chosen now becomes a motive, which leads to *action*, the final step. Without this, however strong his desire, the child would never obtain the apple.

Value of Self-Dependence. These successive steps—impulse, desire, deliberation, choice and action—are all included in an act of will, but in the mature mind, the most common voluntary acts have become habitual to such an extent that the deliberative phase is scarcely noticed. In choosing between desires, one holds in mind past experiences and the desires under consideration, and one also imagines the conditions that will arise from the choice of each of the desires in conflict. This process frequently makes choice a difficult step, and one occasionally calls upon others to decide for him. Choosing a certain course of action is based upon a desire of a peculiarly personal nature, and no one except the person involved is likely to make a satisfactory choice. For this reason each one should make his own choices. The ability to choose varies widely with different people. Some make right choices quickly, while others after long deliberation make unwise choices. Still others choose without deliberation and are liable to spend considerable time in attempting to extricate themselves from undesirable conditions.

Inhibition. One of the highest functions of the will is to prevent action. This function is known as *inhibition*. Its action depends upon conflicting perceptions. If you stoop to pick an apple from the ground, and, as you are about to grasp it, you discover a hornet upon it, your action is instantly arrested, because the injury which you would probably receive from the hornet conflicts with the satisfaction you would obtain from possessing the apple. Action is also arrested by the memory of past experiences. One who has been burned by coming in contact with a flame or a hot stove will not voluntarily come in contact with such an object again. Finally, the power of inhibition is called forth by the conflict of ideas, which necessitates deliberation and choice. This principle has already been illustrated, in describing the conflict of desires.

Inhibition is characteristic of a well-trained will. It develops late, and in children and uncivilized people it seldom reaches

full development. Such persons act upon impulse, while the man with a disciplined mind delays action until after careful deliberation. One in vigorous health and full of energy is more likely to act without deliberation than one whose physical conditions are the opposite. One who is hopeful is more likely to act than one who is doubtful. Because of their lack of experience, children and young people often attempt to perform the impossible, and it is only by repeated failures that they learn the value of deliberation.

Training the Will. The will is one of the most important functions of the mind, and upon its right development depends one's success or failure in life. Because of this, those having care of young children should give the training of the will careful attention. The following principles will be found helpful in securing desired results in will training.

(1) The power to act lies within the nervous system. During childhood and youth this system is plastic and is easily guided in any line of action.

(2) The greatest function of the will is in the formation of habits. Habits formed during childhood are the seeds of character. The parent and teacher cannot give too careful attention to habits formed in the home and the school.

(3) The child is a bundle of impulses and is filled to overflowing with nervous energy. He must act, and it is the duty of both parent and teacher to furnish definite ends toward which his activity may be directed.

(4) Ability to make right choices is important in the formation of character. This ability is acquired and strengthened by practice, and children should be led to make right choices as early in life as possible and to continue the practice until it becomes habitual.

(5) Environment has much to do with the choices made by both children and adults. No one likes to go against the sentiment of his community; hence the proper home atmosphere and school atmosphere are important factors in training the will.

(6) Attention is a fundamental act of will. The child's power of attention should be cultivated and strengthened day by day. See Attention.

(7) All right choices should be acted upon. When a choice is made, it should be carried out. Failure to act has a disastrous effect upon the character, and those who let their desires evaporate without action become the do-nothings of society.

(8) Will is strengthened by effort; therefore, within the limits of their ability, children should frequently be assigned difficult tasks, both at home and at school. Without this training they will never form the habit

of persistent effort, which is necessary to success.

(9) Stubbornness is not evidence of a trained will or of a strong will. One with a trained will decides after due deliberation and in accordance with the best judgment a person can exercise. The stubborn person decides in accordance with his feelings and without deliberation.

Related Articles. Consult the following titles for additional information:

Attention
Feeling
Habit

Instinct
Memory
Psychology

WILL, in law, the legal declaration of a person's wishes as to the distribution of property after his death. It is an individually-made law, which, if its intent is clear beyond doubt and it does not conflict with public policy, no court can set aside. Technically, a *will* can dispose only of real property, the document relating to the disposal of personal property being called a *testament*.

In most states no will or testament is valid unless it is in writing and signed at the end by the maker, or *testator*, or by some person in his presence and by his direction. This signature must be made and the document acknowledged by the testator, in the presence of two or more witnesses, not beneficiaries by the will, present at the same time, and such witnesses must attest and sign the will in the presence of the testator. The will usually names one or more persons, known as executors, to direct the execution of its provisions. If none such is named, or if no will is made, the court appoints an administrator to the estate. In the latter case the property goes to lineal descendants (For the rules for the disposal of the estate in the latter case, see DESCENT). Any alteration in the will must be duly signed by the testator and the witnesses. An addition to the will is known as a *codicil*. A will may be revoked by canceling, obliteration, tearing or burning, by a new will expressly revoking the former, or by one containing provisions inconsistent with it. The destruction of a later will revives a former will. At the death of the testator the will is recorded in the probate court, and that court directs settlements. See PROBATE.

WILLAMETTE, *wil lah'met*, a river of Oregon, 250 miles in length, formed by the junction of the McKenzie and the Middle Fork. It rises in the Cascade Mountains, flows northward through a fertile valley and into the Columbia River. It is navigable to

Portland, fifteen miles from its mouth. A lock canal enables small craft to go around Willamette Falls and ascend 150 miles to Eugene.

WIL'LARD, EMMA HART (1787-1870), one of the pioneers in the cause of women's higher education in America, and founder of the Emma Willard School. She was born at Berlin, Conn. She taught a number of years, became principal of a girls' academy at Middlebury, Vt., and in 1809 married Dr. John Willard. In 1814 she wrote and submitted to New York state officials *A Plan for Improving Female Education*, with the result that she was able to establish at Waterford, N. Y. a girls' seminary partly supported by the state. This institution was removed to Troy and the name afterward changed to Emma Willard School. Under Mrs. Willard's management, it gained a wide reputation and is still one of the leading schools for the higher education of women. Mrs. Willard wrote a number of text-books, and was also the author of the famous poem *Rocked in the Cradle of the Deep*.

WILLARD, FRANCES ELIZABETH (1839-1898), an American educator and reformer, born at Churchville, N. Y., and educated at Northwestern Female College, Evanston, Ill. She taught school for several years, traveled in Europe and the East and on her return became professor of æsthetics in Northwestern University and later its dean of women. She resigned in 1874, became secretary of the Woman's Christian Temperance Union and later its president, holding the latter office until her death.



FRANCES E.
WILLARD

Miss Willard gave her entire time thereafter to the organization, traveling throughout the country from year to year, lecturing in prominent cities and writing extensively for the *Union Signal*, the organization's periodical, which she edited for six years. In 1883 she visited England and helped to form the World's Christian Temperance Union. Her former home, "Rest Cottage," in Evanston, is yet the headquarters of the national organization. In addition to articles in papers and periodicals, she was the author of *Nineteen Beautiful Years, Woman and Tem-*

perance, Glimpses of Fifty Years and other books. See WOMAN'S CHRISTIAN TEMPERANCE UNION.

WILLIAM I, surnamed THE CONQUEROR (1027-1087), the first Norman king of England. He was the natural son of Robert II, Duke of Normandy, and as his father died without a legitimate heir, William became ruler and governed Normandy with vigor and ability.

On the death of Edward the Confessor he claimed the crown of England as the nearest in line of succession. In 1066 he invaded England, overthrew Harold, the rival claimant, and then set about to subdue the people. The resistance of two powerful English nobles, Edwin and Morcar, who had formed an alliance with the kings of Scotland and Denmark and with the prince of North Wales, soon after drew William to the north, where he obliged Malcolm, king of Scotland, to swear allegiance. In 1069 an insurrection broke out in the north, and at the same time the English resumed arms in the eastern and southern counties, only, however, to be put down mercilessly.

William then established the administration of law and justice on a firm basis throughout England, conferred numerous grants of land on his own followers and introduced the feudal system of Normandy, in regard to land tenure and services. Toward the end of his reign he instituted that general survey of the landed property of the kingdom, the record of which still exists, under the title *Domesday Book*. Although the English had been completely subdued, William had to suppress several formidable revolts of his own vassals, and these he put down with an iron hand. Some of his measures were extremely severe, but they were in keeping with an age of brutality.

As a man William was not without a certain sense of equity and fair dealing, but was willing to sacrifice everything to make his kingdom stable. Viewed in the perspective of history, he is seen as one of the makers of modern England. See HASTINGS, BATTLE OF; DOMESDAY BOOK.

WILLIAM II (about 1056-1100), called RUFUS ("the Red"), son of William the Conqueror, was crowned king at his father's death. The Norman barons were discontented with this arrangement and sought to make his elder brother, Robert, who had received Normandy, king of England, but this

project was defeated by William, with the aid of the English nobles. Having repressed the conspiracy, he forced the Norman barons to withdraw to Normandy and confiscated their English estates. On the death of Lanfranc, he also seized the estates connected with the vacant bishoprics and abbeys. In 1090 he sent an army into Normandy, to punish his brother Robert, while he himself crossed the Channel the following year. A reconciliation was effected between the two brothers, and in 1096 Robert mortgaged Normandy to his brother, for a sum sufficient to enable him to join a crusade to the Holy Land. William was shot while hunting in the New Forest, whether accidentally or otherwise is not known.

WILLIAM III (1650–1702), king of England, Scotland and Ireland. He was born at The Hague, the posthumous son of William II of Orange and Mary, daughter of Charles I of England. During his early life, all power in the Netherlands was in the hands of the grand pensionary DeWitt, but when France and England in 1672 declared war against the Netherlands, there was a popular revolt, in which DeWitt and his brother were murdered and William was declared captain-general, grand admiral and stadtholder of the United Provinces. In 1678 William concluded with France an honorable treaty at Nimeguen.

Meanwhile, William had married Mary, the daughter of James II of England. As she was heir presumptive to the English throne he kept close watch upon the policy of James II, and in 1688 issued a declaration recapitulating the unconstitutional acts of the English king and promising to secure a free Parliament to the people. Being invited over to England by the leaders of the English parties, he arrived suddenly at Torbay in November, 1688, with an army. A great part of the nobility declared themselves in his favor. In December James fled with his family to France.

The throne was then declared vacant, the Declaration of Rights was passed, and early in 1689 William and Mary were crowned. Scotland soon afterwards accepted the new sovereigns, but in Ireland, whither Louis XIV sent James with an army, the majority of the Catholics maintained the cause of the deposed king, until they were defeated at the Boyne (1690). In the war with France William was less successful; but in spite of

several defeats, he finally compelled Louis to acknowledge him king of England. In 1701 James II died and Louis XIV acknowledged his son as king of England. England, Holland and the Empire had already combined against Louis, and the War of the Spanish Succession was just on the point of beginning, when William died from the effects of a fall from his horse.

WILLIAM IV (1765–1837), king of Great Britain and Ireland, the third son of George III. He was educated for the navy, and although he had no real ability, he was promoted through successive ranks, until he became lord high admiral. In 1830 he succeeded his brother George IV on the throne. The great events which render his reign memorable are the passage of the Reform Act, the abolition of slavery in the colonies and the reform of the poor laws. William himself was mentally most unfit for ruling, but his ministers had matters almost entirely in their own control. He was succeeded by his niece, Victoria, whose reign was destined to be the longest and one of the most notable in English history.

WILLIAM I (1797–1888), king of Prussia and first emperor of Germany, crowned as such at Versailles in 1871. He was the son of Frederick William III of Prussia and Queen Louise. From his earliest years he received military training, and as early as 1814–'15 fought in the campaigns against Napoleon. He provoked the enmity of his people by his opposition to constitutional reform, to the extent of having to flee from the country at the beginning of the revolution of 1848. In 1849 he was in command of the army which crushed the uprisings in the Palatinate and Baden.

He became king of Prussia in 1861, and with the aid of his powerful minister, Bismarck, grew steadily in power. War against Denmark in 1864 was followed by war against Austria in 1866 and against France in 1870. The outcome of these conquests, in which William himself led the Prussian armies, was the consolidation of the German states into the empire whose aggressions forty years later involved the whole world in war (see GERMANY; WORLD WAR). It is an interesting fact that in 1919 German representatives signed a drastic peace treaty within one hundred feet of the spot where William I was crowned emperor. See VERSAILLES, TREATY OF.

WILLIAM II, in German, **WILHELM II** (1859–), the last king of Prussia and last German emperor, a monarch who rose to supreme heights of power and influence, but who became the most hated man in the world, suffering humiliation and dishonor after a reign in which Germany became one of the great world powers.



WILLIAM II

The career of this last William of the House of Hohenzollern is one of the most spectacular and one of the most tragic in history. He

ascended the throne on June 15, 1888, at the age of twenty-nine, the successor of his father, Frederick III, who had reigned only three months. His mother was Victoria, princess royal of Great Britain, the sister of King Edward VII. The young emperor began his reign with a definite conception of the dignity of his office. Like his grandfather, William I, whom he revered, he believed in the divine right of kings, and almost from the outset of his imperial career there was friction between himself and his strong-willed Chancellor, Prince Bismarck. The resignation of the latter, in March, 1890, was the first striking evidence of the determination of the new ruler to exert his authority as he chose.

Notwithstanding his autocratic habit of mind, William II did much for Germany. The empire became industrially the most highly-developed country on the continent, and its expansion as a commercial nation was no less striking. Through his efforts Germany secured important holdings in Africa, Asia and the Pacific islands, and became a great colonial power. At the same time it developed into the greatest militarist nation in the world, through a system of universal service, planned and carried out with precision and iron discipline. The kaiser, as he was commonly called, took the greatest pride and delight in his finely-trained army, and there is no doubt that he had visions of its going into action some day to give Germany its "place in the sun." The navy, too, was built up and made second in strength to that of Great Britain. The influence of the kaiser was so manifest in all

of this military and naval activity that he was called the "war lord of Europe." Apparently, however, he sought to cultivate only the friendship of the other nations.

The energetic German ruler was not without opposition in the empire, though he was very popular with the people as a whole. His obstinate hostility to electoral reform and his medieval conception of the kingship as a divine institution antagonized the Social Democrats, and between them and the emperor there developed a bitter feud. The emperor sought to quiet political discontent by securing good living conditions for the working people, and by such reforms as health insurance, old age pensions and the like. The Socialists refused to be diverted from their main issue, that of securing political equality for all, and to his discontent they greatly increased in numbers.

The outbreak of the great war in 1914 focused the attention of the world on Germany's emperor. The power to declare a defensive war was vested with him, and he insisted that it was in defense of the Fatherland that he signed the decree mobilizing the army. The course of events subsequent to the outbreak of the war tended to disprove this statement, and the consensus of opinion later was that he regarded the Austro-Serbian episode as an opportunity for Germany to expand territorially and commercially. A short victorious war restricted to Central Europe would put down the Pan-Slavic agitation, crush Serbia, check Russia and lay the foundation for German supremacy in the Balkan states and, eventually, in Asia. William II's ambition overreached itself. In striving to bring about German world dominion he accomplished Germany's humiliation—the loss of its colonies, its fleet, portions of its European territory and, most serious of all, the regard of the world. Justly or not, the brutalities practiced by the German forces on land and sea roused tremendous feeling against the once-honored emperor, and he reaped a whirlwind of scorn and hatred.

When the German people found that defeat faced them, they revolted and demanded new leaders. On November 28, 1918, seventeen days after his armies had demanded an armistice to save them from annihilation, William II signed a formal document of abdication, having previously sought refuge in Holland. He was received at the castle

of Count Goddard Bentinck at Amerongen, where he remained in retirement for several months. In January, 1920, the allied powers demanded that the former emperor be delivered to them for trial for war offenses; Holland refused to surrender him. In April, 1921, the kaiserin died and was buried in Germany. See GERMANY.

WILLIAM I, PRINCE OF ORANGE, COUNT OF NASSAU, called THE SILENT (1533–1584), founder of the Dutch Republic. He was brought up in the Catholic religion, although both his parents were Protestants. In 1544 he inherited from his cousin the principality of Orange and large estates in the Netherlands. Under Charles V he served as commander of the army of the Netherlands and governor of Holland, Zealand and Utrecht. Philip II employed him in various offices, without, however, really trusting him.

When the duke of Alva entered the Netherlands, William withdrew to Germany. His first open resistance to Spain was an invasion of Brabant in 1568. This was unsuccessful, and a second attempt in 1572 met with no better fate. William had been before this time chosen stadtholder by Holland, Utrecht, Zealand, Gelderland and Overijssel, and in 1576 he succeeded in bringing about the "pacification of Ghent," whereby the southern provinces united with the northern, to expel the Spaniards and secure religious liberty. The southern provinces shortly broke away from their allegiance to William, but in 1579, by the Union of Utrecht, the seven northern provinces, Holland, Zealand, Gelderland, Friesland, Utrecht, Groningen and Overijssel, were formed into a league, which two years later formally deposed Philip and declared itself a republic with William as hereditary stadtholder. A price had been set by the king of Spain on William's head, and several unsuccessful attempts were made to assassinate him; a few years later he was shot at Delft.

WILLIAM AND MARY COLLEGE, an institution of higher learning at Williamsburg, Va., next to Harvard the oldest in the United States, having been founded in 1693. It was named in honor of the reigning king and queen of England, and, endowed by the government, soon attained prosperity. It suffered heavily during both the Revolution and the Civil War, and for a period between 1881 and 1888 it was so crippled financially that it had to close its doors. But in 1888 a

state appropriation enabled it to reopen, and an indemnity of \$64,000, granted it by Congress in 1893, for its losses in the Civil War, put it again on a firm foundation. The college offers two courses, a collegiate and a normal course. It has about 400 students and about fifty instructors. Women were admitted to all college courses for the first time in 1918.

WILLIAMS, JOHN SHARP, (1854–), an American statesman, born at Memphis, Tenn. He studied at the Kentucky Military Institute at Frankfort, the University of the South, the University of Virginia and the University of Heidelberg. He was admitted to the Tennessee bar in 1877, and in the following year removed to Yazoo City, Miss., where he practiced law and also became a planter. Taking an active part in Democratic politics, he was elected to Congress in 1893 and served continuously for sixteen years, becoming the leader of the Democratic party in the House. In 1911 he was elected Senator from Mississippi and was reëlected in 1917.

WILLIAMS, ROGER (1604–1683), a Puritan divine, founder of the colony of Rhode Island, born of Welsh or Cornish parents. He attended the Charter House School and the University of Cambridge. Because of his Puritan beliefs he emigrated in 1631 to New England. There he became pastor of a church at Salem, but his extreme views regarding the jurisdiction of the civil magistrate caused him to be banished from the colony of Massachusetts, and he went with a few companions to Rhode Island and founded a settlement, which he called Providence. Here he formed the first Baptist church in America. He was twice in England, in connection with a charter for the colony, and there he made the acquaintance of Milton and other prominent Puritans. He published *A Key into the Language of the Indians of America*, *The Bloudy Tenent of Persecution for the Cause of Conscience*, *The Bloudy Tenent yet more Bloudy* and *George Foxe Digged out of His Burrowes*.

WILLIAMSBURG, VA., the county seat of James City County, forty-eight miles southeast of Richmond, on a peninsula between the James and York rivers and on the Chesapeake and Ohio railroad. The town is one of the oldest in the United States. It was settled in 1632, became the capital of Virginia in 1698, and was the first city

in the state to receive a charter (1722). William and Mary College, the second oldest college in the United States, established here in 1693, is still the chief feature of the city. There are also the Eastern State Hospital for the insane, erected in 1769, and the Williamsburg Female Institute. The courthouse dates from 1769. During the Civil War the first important engagement of the Peninsular campaign took place at Williamsburg. The city is the center of important fish and oyster interests and has manufactories of knit goods, brick and lumber. Population, 1920, 2,462.

WILLIAMS COLLEGE, a nonsectarian school for men at Williamstown, Mass., which developed from a free school established by Colonel Ephraim Williams. The funds donated by the colonel, who was killed in 1755, were invested and not used until 1793, when the school was chartered. The college has a faculty of over fifty members, an average attendance of about 500 and a valuable library containing about 90,000 bound volumes and 17,000 pamphlets. The prosperity and high rank of the institution are largely due to the work and influence of Mark Hopkins, who was its president from 1836 to 1872. Among the well-known men who attended Williams are William Cullen Bryant, President Garfield and his son Harry A. Garfield. The latter has been president of the college since 1908, except for the period of the World War, when he served as fuel administrator.

Williamstown is in Berkshire County, five miles west of North Adams. In 1920 it had a population of 3,707.

WIL'LIAMSPORT, PA., the county seat of Lycoming County, ninety-five miles northwest of Harrisburg, on the West Branch of the Susquehanna River and on the Pennsylvania, the Philadelphia & Reading and the New York Central railroads. The city is on the Alleghany plateau, in an agricultural, mining and lumbering section. Its industries include numerous lumber mills, clothing factories, steel works, furniture factories and manufactories of rubber goods, motors, gasoline engines, valves, pumps, dyes, wire rope, shoes, silks and sewing machines. Among the prominent buildings are a city hall, a Federal building, the James V. Brown Library, a state armory, two hospitals, a home for the friendless and a Masonic Temple. The Dickinson Seminary is located here.

The place was settled in 1779, was incorporated as a borough in 1806, and chartered as a city in 1866. It adopted the commission form of government in 1912. Population, 1910, 31,925; in 1920, 36,198, a gain of 14 per cent.

WILLIMAN'TIC, CONN., one of the county seats of Windham County, sixteen miles northwest of Norwich, at the confluence of the Willimantic and the Natchaug rivers and on the New York, New Haven & Hartford and the Central Vermont railroads. Willimantic is popularly known as the "Thread City," the manufacture of thread being its principal industry. Other manufactures are silk goods, cotton prints and twills, plumbers' supplies, boxes and fine machinery. Most of the factories are run by water power. A state normal school is located at Willimantic, also a state armory. The city has a Federal building and two libraries. It was settled about 1822, was incorporated as a borough in 1833, and was chartered as a city in 1893. Population, 1910, 11,230; in 1920, 12,330, a gain of 10 per cent.

WIL'LIS, NATHANIEL PARKER (1806-1867), an American author, born at Portland, Maine, educated at Andover and at Yale. During his college days he attracted some attention with his verse, and after graduation was employed by S. G. Goodrich to edit *The Legendary* and *The Token*. The *American Monthly Magazine*, from its establishment to its consolidation with the *New York Mirror*, was under his control. Willis traveled for some years as correspondent of the *Mirror* in France, Italy, Greece, Turkey, Asia Minor and England, and of the famous men whom he met he wrote in *Pencilings by the Way*. Many of these articles caused offense by their personal tone. After his return to America, he conducted several journals, all of which except the *Home Journal* were short-lived. His works include poetry, travels and society sketches, in all of which he displays a facile style, but no great profundity of thought.

WILL'-O'-THE-WISP. See IGNIS FATUUS.

WILLOW, *wil'o*, a group of trees and shrubs common in the cold and temperate regions of the northern hemisphere, with a few representatives in Australia and some of the islands of the Southern Pacific. All thrive in moist ground, and are most common

on the banks of streams and ponds and in marshes. The alternate leaves are long, slender and pinnate; these are preceded by flowers in the form of catkins. The catkins, which are clothed with long, glossy hairs, are popularly known as *pussy-willows*. On account of the flexible nature of the shoots of many species and the toughness of their wood and fibers, they have always been used as materials for weaving baskets, hoops and crates. Baseball bats, hoe handles and many similar articles are made from the wood of the white willow, and wooden shoes, pegs and other small objects are constructed from other species. The *weeping willow*, which is a native of China, is a fine ornamental tree that is often planted in parks.

WILMINGTON, DEL., the largest city in the state and the county seat of New Castle County, is twenty-seven miles southwest of Philadelphia, on the Delaware River, at the junction of the Christiana and the Brandywine rivers, and on the Baltimore & Ohio, the Philadelphia & Reading and the Philadelphia Baltimore & Washington railroads. The city is picturesquely situated on hilly ground and extends about four miles back from the Delaware river. The falls of the Brandywine afford water power which turns the wheels of numerous iron and steel works, foundries, machine shops and rolling mills. There are large shipbuilding yards, railroad shops and brick yards. A score of leather plants have made Wilmington the center of that industry in the United States. It is the location, also, of immense powder plants and a large paper making industry. The city is an important port of entry, having a foreign trade amounting to about \$24,000,000 a year.

Among the educational institutions are the Friends' School, a military academy, the Hebbs School, Goldey College, the Ursuline Academy and two business colleges. The libraries include the public, the law and that of the historical society. Holy Trinity Church, built by the Swedes in 1698, is said to be the oldest church in continuous occupation in the United States. Some of the charitable institutions are the industrial school for girls; the Ferris Industrial School for boys; the Delaware and the Homeopathic hospitals; a home for friendless children; Saint Peter's Orphanage; Saint Joseph's Home; two homes for aged men and women, the state hospital for the insane and the county almshouse. Other prominent build-

ings are the courthouse, the Federal building, the customhouse and the Auditorium.

Wilmington was first settled by the Swedes under Peter Minuit in 1638. It was taken by the Dutch in 1655, and they in turn were succeeded by the English in 1664. Soon after this the place was brought under the proprietorship of William Penn. The town was laid out about 1731. It was incorporated as a borough in 1739, and was chartered as a city in 1832. Population, 1910, 87,411; in 1920, 110,168, a gain of 26 per cent.

WILMINGTON, N. C., the county seat of New Hanover County, 148 miles southeast of Raleigh, on the Cape Fear River and on the Seaboard Air Line and the Atlantic Coast Line railroads. It is about thirty miles from the sea, and is an important port of entry for a large foreign and coastwise trade. The principal exports are cotton, rice, turpentine, vegetables, lumber and naval supplies. There are extensive manufactories of lumber and cotton products, dyes, metal goods, hosiery, fertilizers, ice and foundry goods.

Some of the prominent structures of Wilmington are a Federal building, a courthouse, a Masonic Temple and a public library. Important institutions are Cape Fear Academy, a county hospital, United States Marine Hospital, a house of correction and a home for aged women. Wrightswood Beach, a popular summer resort, is located on an island eight miles east.

Wilmington was settled in 1830, and was called New Liverpool and later Newtown. It was incorporated as the town of Wilmington in 1739, and was the capital of the province after 1743. Before the Revolution it was one of the first to resist British authority. During the Civil War the port was one of the most important in the Southern states. Fort Fisher, protecting the harbor, was captured by Federal forces on January 15, 1865, and the town itself was entered by General Terry on February 22. Wilmington was chartered as a city in 1866. It has adopted the commission form of government. Population, 1910, 25,748; in 1920, 33,372.

WILMOT PROVISIO, *pro vi'zo*, an amendment presented in Congress in 1846 to a bill providing for the purchase of territory from Mexico. It was offered by David Wilmot, a Democrat from Pennsylvania, and provided that "neither slavery nor involuntary servitude shall ever exist in any part of such territory, except for crime whereof the party

shall first be duly convicted." The amendment was adopted in the House, but did not come to a vote in the Senate, and in the next Congress the bill was finally passed without the amendment.

The debate in Congress over the question resulted in a breach between Northern and Southern Democrats, which led to the adoption by that party of the doctrine of popular sovereignty. This in turn resulted in the withdrawal of many Northerners, who joined the Free-Soilers and later became prominent in the Republican party.

David Wilmot (1814-1868), an American politician and jurist, born at Bethany, Pa. He was admitted to the bar in 1834 and began his practice at Towanda. He became a prominent Democrat and served in the House of Representatives from 1845 to 1851. There he opposed the extension of slavery into the territory acquired from Mexico and was the sponsor for the famous Wilmot Proviso. He later joined the Republican party, was an unsuccessful candidate for governor of Pennsylvania in 1857, served in the Senate for two years (1861-1863), and thereafter was judge of the United States court of claims.

WILSON, AUGUSTA EVANS (1835-1909), an American novelist, born at Columbus, Ga. In 1868 she married a Mr. Wilson and afterwards lived at Mobile, Ala. Her books are sentimental, but harmless, and make a wide appeal. They have retained a greater popularity over a longer period than the collected works of any other American novelist. The titles are *Inez*, *A Tale of the Alamo*, *Beulah*, *Macaria*, *Saint Elmo*, *Vashti*, *Infelice* and *At the Mercy of Tiberius*.

WILSON, HENRY (1812-1875), an American statesman, born in Farmington, N. H. His original name was Jeremiah Jones Colbraith, but he abandoned the name upon reaching manhood. He was first employed on a farm, later he learned the shoemaking trade, earned money to pay for an academic education and finally engaged in the manufacture of shoes at Natick, Mass. In 1840, as the "Natick cobbler," he addressed political meetings, winning wide fame, and in that year he was elected to the Massachusetts legislature. In 1848 he began to edit the *Boston Recorder*, as a Free-Soil organ. In 1855 he was chosen United States Senator, as a Free-Soiler or Know-Nothing, to succeed Edward Everett. His speeches against slavery are among the most important of the period. He served for

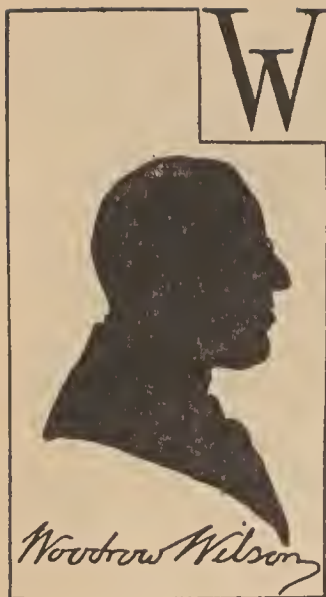
a short time on the staff of General McClellan in the Civil War. In 1872 he was elected Vice-President, on the ticket with President Grant, but died before completing his term.

WILSON, JAMES (1742-1798), a native of Scotland, an emigrant to the American colonies in 1766, an eminent patriot and a signer of the Declaration of Independence. He became a member of the Colonial and Continental congresses, and also of the Constitutional Convention of 1787. His speech in the Pennsylvania convention later secured the ratification of the Constitution by that state.

WILSON, JAMES (1835-1920), an American statesman and administrator. He was born at Ayrshire, Scotland, and emigrated to America at the age of seventeen. He attended Iowa College, engaged in farming and later entered the state legislature, of which he became speaker. From 1873 to 1877, and from 1883 to 1885, he was a member of Congress. At different times he was regent of the University of Iowa, director of the Agricultural Experiment Station and Professor of Agriculture at the Iowa Agricultural College. In 1897 he became Secretary of Agriculture, remaining in that post sixteen years, a longer term than any other cabinet member has ever served.

WILSON, JOHN (1785-1854), a Scottish poet and essayist, better known as "Christopher North." He was born at Paisley, Scotland, educated at Glasgow University and at Oxford and on leaving college settled on an estate on Lake Windermere, where he gave himself up to literary work. Wordsworth, Southey and Coleridge were among his acquaintances. His first independent publication was a poem called *The Isle of Palms*, and this was followed by *The City of the Plague*, a second book of poems. When *Blackwood's Magazine* was established, in 1817, Wilson became one of its contributors, and for many years he wrote some of the most notable articles in that periodical. In 1820 he was appointed to the chair of moral philosophy in Edinburgh University, a position which he held for thirty-one years.

Most famous, perhaps, of the writings of Wilson are the *Noctes Ambrosianae*, which abound in graceful humor and sentiment. Among his other works are three novels, *The Lights and Shadows of Scottish Life*, *The Trials of Margaret Lyndsay* and *The Foresters*.



WILSON, [THOMAS] WOODROW (1856-1924), an American educator, writer and statesman, the twenty-eighth President of the United States, and the only Democrat to serve two consecutive terms since Andrew Jackson. His administrations are linked with such stupendous changes in domestic and international history, and events and problems of such vast import confronted him almost from his first inauguration, that it is difficult to arrive at a just estimate of his place in history. No man of outstanding importance can be properly judged by his own generation; but, even though there is lacking the necessary perspective of time, it is clear that he ranks with the greatest of American Presidents. A man of deep sympathy for the workers of all nations, he stirred the masses by his remarkable state papers as no other statesman has moved them, and it is not an exaggeration to say that his writings have been read and quoted more widely than those of any other public leader of his time.

It happened that the greater part of his administrations ran parallel with a terrible world struggle in which traditions, laws and organizations centuries old were swept away. Into the tide of war America was drawn, under the leadership of Woodrow Wilson, who had been called pacifist and impractical idealist by those out of sympathy with his methods and policies. Yet it was this peace-loving President who held the nation almost a unit through the anxious days of the war, who brought new inspiration to the war-weary masses in the allied countries, and who broke down the iron discipline of the subjects of the German emperor by his insistence on America's just aims in fighting.

President Wilson's fame as the spokesman of the allies and interpreter of American ideals is unquestioned. Whether the world was ready for the acceptance of his principles and whether the foundations of a lasting peace were laid in the treaty he helped to frame, time alone can tell, but it is certain that he had a decisive part in bringing the war to a close. For this achievement he must remain a great world figure.

Early Life. Both of the grandfathers of Woodrow Wilson were born in the British Isles. His mother's father, Thomas Woodrow, was a Scotch Presbyterian clergyman who at one time preached in a small church in Carlisle, England. Subsequently he went as a missionary to Canada, and eventually held a pastorate in Chillicothe, Ohio. The paternal grandfather, James Wilson, was an Ulsterman of County Down. He emigrated to America in 1807, and became a successful printer and newspaper owner in Pennsylvania. Joseph Ruggles Wilson, the youngest son of James Wilson and the father of the future President, was a well-known educator and a distinguished clergyman of the Presbyterian Church, South. He held several professorships in Southern colleges, and was pastor at various times in three different states. While Dr. Wilson was preaching in Staunton, Va., his third child and first son, Thomas Woodrow, was born, on December 28, 1856. The boy was taught at home until his ninth year, and in 1873, when a lad of seventeen, he entered Davidson College, N. C. Before the end of the first year he left school because of ill health, and when he reentered college, in 1875, he registered at Princeton.

Woodrow Wilson (the name Thomas he never used) was active in the university debating and literary circles, was managing editor of *The Princetonian* in his senior year, and won other honors as an undergraduate. He was graduated with the class of 1879, entered the law school of the University of Virginia, where he remained a year, and in 1882 began the practice of law in Atlanta, Ga. At college he had been keenly interested in the study of political science, and had read voluminously on the subject. As a young lawyer he found that study was more absorbing than the trying of cases, and in the course of a year he abandoned his practice to become a postgraduate student at Johns Hopkins University. Here he specialized in government and jurisprudence.

Career as Educator. In 1885 Wilson received his doctor's degree, having submitted as his thesis a book that is now a standard classic in its field—*Congressional Government: A Study in American Politics*. It is an interesting fact that the theories which the young man worked out in this small volume were consistently applied by him years later as Governor of New Jersey and as President of the United States. In his thesis he de-

clared that the method of preserving balance in governmental functions by having the legislative and executive administrations act as a check upon each other was weak in that it did not provide for effective leadership. His idea was that the executive should assume the official leadership and since government by political parties had become a fact, that the President should be not only the leader of the people as a whole, but the head of his own party.

It was many years before Wilson had the opportunity to put these theories to a test. For a quarter of a century after leaving Johns Hopkins he rose steadily to distinction as an educator. From 1885 to 1888 he was associate professor of history and political economy at Bryn Mawr College, and from 1888 to 1890 held a similar position at Wesleyan University, Middletown, Conn. While at Wesleyan he published *The State*, another classic on political science, an analysis of the governments of various nations. This book has been widely used as a text in colleges and universities.

Wilson was offered the professorship of jurisprudence and political economy at Princeton in 1890, and in that year began an association with his alma mater that was to last twenty years. In 1902 he succeeded Dr. Francis L. Patton as president of the university. He had been remarkably successful as a teacher, partly because of his scholarship and grasp of his subject, and partly because of his attractive method of presenting it. His career as head of the institution was no less successful.

Among the several reforms inaugurated by Wilson as head of the university, the most radical was the introduction of the preceptorial system. About fifty preceptors were added to the faculty for the purpose of bringing about a closer relationship between the students and the teaching force. New professors distinguished in special fields were also brought to the institution, the equipment was enlarged and improved, and large endowments for the graduate school were secured. One attempted reform of the president met with opposition that defeated it—the plan of doing away with the exclusive senior-junior clubs in the interest of greater democracy in university life. On the whole, however, Wilson's record was sufficiently brilliant to make him a prospective nominee for governor in 1910.

In Politics. New Jersey was a Republican state, and the president of Princeton was a Democrat, but a long period of "boss" government had created a popular demand for a higher type of official, and when the Democratic convention nominated Wilson the liberal elements of all parties could approve the choice. The Democratic candidate set a new standard of campaigning, for he presented a progressive, straightforward platform and refrained from abusive personalities. Elected by a plurality of 49,056, in a state that had been Republican for sixteen preceding years, he carried out his program as he had outlined it.

As governor he showed exceptional qualities of leadership, guiding through the state legislature a number of measures designed to remedy various political and economic evils. When he met with "machine" opposition he did not hesitate to appeal to the people over the heads of the politicians, and in 1911, by a speaking tour through the state, he defeated the efforts of the machine to override the primary vote for James E. Martine, candidate for United States Senator. A record like this naturally made him a national figure in politics, and people began to study his career.

As the Presidential campaign of 1912 drew near the progressive governor of New Jersey was prominently mentioned as a candidate, and in the Democratic national convention which met at Baltimore, Md., he was nominated after a somewhat protracted contest. His chief opponent, Champ Clark of Missouri, had the backing of the conservative elements, but the fight for Wilson's nomination was led by William Jennings Bryan, still a powerful leader, though three times defeated for the Presidency. Public opinion veered strongly in favor of the New Jersey candidate in the closing hours of the convention, and his nomination was accepted with hearty approval by the rank and file of the party. The Republicans had split into two camps, which made the election of Wilson almost a foregone conclusion. His campaign, however, strengthened the favorable impression he had made, especially as he refused to be drawn into personal arguments. With Thomas R. Marshall of Indiana as his running mate, he carried forty states and received 435 electoral votes. The popular vote stood 6,286,214 for Wilson; 4,126,020 for Roosevelt; 3,383,922 for Taft.

As President. During the administration of President Taft, Wilson's immediate predecessor, popular feeling had run high against the Republicans because of their refusal to "revise the tariff downward." In the Congressional elections of 1910 the Democrats had gained control of the House, and through the Republican split of 1912 they secured a working majority in the Senate, besides increasing their strength in the lower body. The President therefore began his administration with a congress composed largely of his own political faith. His legislative program, among other things, called for a new tariff law, a revision of the banking laws and stricter regulation of private monopolies. The tariff was first disposed of.

Congress (the Sixty-third) was called in special session on April 7, 1913, primarily for the purpose of framing a new tariff law. President Wilson excited much comment by appearing personally before the assembly and reading his message himself, a practice which had been abandoned after the administration of John Adams. Representative Underwood of Alabama and Senator Simmons of North Carolina had charge of the framing of the bill, which, after weeks of debate, was signed on October 3 by the President, who more than once was forced to exert pressure to push it through. The bill brought about a general reduction of duties on a long list of commodities.

Meanwhile, during the debate on the tariff, important preliminary work was being done on the revision of the banking laws, and when the tariff was out of the way Congress took up the debate of the Glass-Owen, or Federal Reserve Act. The foundation for this legislation had been laid by the Monetary Commission created in 1908. The act was passed in December by the regular session of Congress, and received the President's signature on December 23 (1913). It was in some respects one of the most important pieces of domestic legislation enacted since the Civil War, and its passage reflected favorably on the President's powers of leadership and his broad statesmanship.

After the midwinter recess Congress re-assembled on January 20, 1914, and heard the President's message on anti-trust legislation. Two important laws followed—the Clayton Anti-Trust and the Trade Commission acts. By the former, interlocking directorates were made illegal; the latter

created a commission with powers over corporations similar to those exercised over the railroads by the Interstate Commerce Commission. Another important piece of legislation was the repeal of the act exempting American coastwise shipping from paying tolls at the Panama Canal. The President used his influence in favor of this repeal because he held that the act violated American treaty agreements with Great Britain. Meanwhile vexatious international questions were beginning to confront him.

Trouble with Mexico. Shortly before President Taft went out of office, Madero, the deposed President of Mexico, was murdered, presumably by the orders of Huerta, who had led a revolution against him. Taft had refused to recognize the Huerta régime, and this policy was maintained by Wilson, who, in a special message to Congress in December, 1913, declared that stability in Mexico was dependent upon the downfall of Huerta. It was the general policy of the Wilson administration to discourage revolutions in the Latin-American republics by refusing recognition to usurpers. The Mexican problem, however, seemed to offer no solution. Some Americans favored active intervention to protect American lives and property in the troubled country, and these bitterly criticized the President for maintaining a policy of watchful waiting. Wilson, who fully realized the consequences of sending an army to "clean up" the country, and the adverse effect it would have on South American republics, too often suspicious of American motives, refused to do more than lift the embargo on the shipment of arms into Mexico, where a counter-revolution against Huerta was being carried on by Carranza and Villa. Circumstances, however, forced his hand.

In April, 1914, several American marines were arrested at Tampico by Mexican officers. Rear-Admiral Mayo, the American commander, demanded that the Americans be released and that Huerta formally apologize and order a salute to the American flag. Complications arose over Huerta's refusal to salute the flag, and the President on April 20 asked and received from Congress authority to use the naval and military forces of the United States to enforce the demand. Vera Cruz was occupied by American forces, but open hostilities were averted by an offer of mediation on the part of Argentina, Brazil and Chile (the "A B C" powers of South Amer-

ica). While an arbitration commission was in session at Niagara Falls, the situation was cleared by the resignation of Huerta.

After an interval Carranza succeeded in setting up a provisional government, which President Wilson formally recognized on October 19, 1915. Meanwhile, the World War in Europe had broken out (August, 1914), and Villa, who had quarreled with Carranza, was increasing the state of disorder by bandit raids against Mexicans and Americans alike. Matters came to a climax in March, 1916, when the town of Columbus, N. M., was raided at night by about 1,500 Villistas. Property was destroyed and several Americans were killed, the news of which made the people of the United States hot with indignation.

President Wilson called out the militia to guard the border, and an expedition under Pershing advanced into Mexico for the ostensible purpose of getting Villa, "dead or alive." Carranza maintained a hostile attitude toward the enterprise, and the utmost caution was preserved by the Americans to prevent a clash between the two governments. The public, many months later, learned that German intrigue was responsible for much of Villa's activity, and the wisdom of the administration's course was vindicated. In February, 1917, the expedition returned home, where a greater crisis was to be met.

America and the War in Europe. When the great war broke out in 1914 the majority of Americans breathed a sigh of relief that three thousand miles of water lay between them and the scene of struggle, and the President's proclamation of neutrality was generally accepted with approval. But neutrality was a most difficult thing to maintain. The great majority of American citizens of German blood found themselves openly sympathetic with Germany, and began to resent the shipment of supplies to the allied nations, because allied control of the seas made like shipments to Germany impossible.

On the other hand, large numbers of Americans who had no ties overseas began to feel stirrings against Germany. The invasion of Belgium was something that could not be talked away, and as the war progressed and appeals for help came from the areas devastated by German forces this hostile feeling deepened. When the liner *Lusitania* was sunk by a submarine, in May of 1915, and the

people read that over one hundred American lives were lost, there was open talk of joining the allies. The President, however, refused to be moved by the extremists on either side. Instead of suggesting war he bent his energies toward forcing Germany to keep its submarine warfare within the rules of international law and humanity, and he would not yield to the German and pacifist propaganda for an embargo on supplies to the allies, as he rightly held that such a course would be a violation of American neutrality.

The Campaign of 1916. In the summer of 1916 President Wilson and Vice-President Marshall were unanimously nominated to succeed themselves by the Democratic convention which met at Saint Louis. The Republicans nominated Charles Evans Hughes and Charles W. Fairbanks. The campaign lacked the dramatic elements of the fight of 1912. The Democrats asked for Wilson's reelection because of his record for constructive legislation, and his tactful handling of the international problems, which had "kept the country out of war." The Republicans vigorously attacked the domestic and foreign policies of the administration, but they failed to convince the country that a Republican régime would do any better.

President Wilson's personality had made a tremendous impression. He was criticized by his enemies as being vacillating and inconsistent, but there was a widespread feeling among the people that the man who occupied the executive chair had always acted from high motives, had never permitted dictation to him, and could be trusted further with the affairs of the nation. The contest was close. Though Wilson increased his popular vote over that of 1912 by nearly 3,000,000, he won by an electoral vote of 277, only twenty-three more than Hughes received. The outcome was not definitely known for several days after the election. The Democrats made heavy inroads in normally Republican states, especially in the West.

The Nation at War. Toward the close of 1916 President Wilson published a note requesting that the warring countries of Europe state the precise objects for which they were fighting. To this suggestion both groups of belligerents responded, the allied reply being by far the more specific. With the allied and German replies as a basis, the President addressed the Senate on January 22, 1917. He told his auditors that the United States

would be forced to play a part in the establishment of a durable peace, and that such a peace would be based on "equality of right among great and small nations" and upon "the freeing of subject people." Many people thought that the President was paving the way for an offer to mediate between the two groups of belligerents, but all hopes for peace were abandoned when the German government announced, late in January, that unrestricted submarine warfare would be started on February 1.

This announcement meant that the President's efforts to keep peace by diplomacy had failed. Unhesitatingly he broke off relations with Germany, and on April 6, 1917, signed the Congressional resolution that made the United States an associate with the allies in the great World War. (Details on the events leading up to this resolution and an account of the part America played in the war, both at home and abroad, will be found under the headings UNITED STATES and WORLD WAR.)

The unanimity with which the American people rallied to the support of the administration in this crisis surprised the most optimistic. President Wilson's qualities of leadership never appeared to better advantage than during the nation's participation in the war. He had the confidence of the people as a whole, regardless of party, and his war utterances, magnificent in spirit and couched in inspiring language, stirred America to a high plane of patriotism and devotion. His message caught the ear of the masses in Europe, weary and heartsick over the cruel prolongation of the war, and gave them new courage. Germany listened, too.

During the period of negotiations in the fall of 1918, when Austria and Germany were making proposals for peace, President Wilson was the spokesman for the allies, and at the time the armistice was signed, on November 11, he was probably the most talked-of statesman in the world. It is a remarkable fact, however, that a week before this supreme climax of the war, the American people had elected a new Congress in which the Democrats had been repudiated and Republicans were in the majority, and had voted thus in spite of a direct appeal from the President to send Democrats to Congress.

This appeal was widely misunderstood, and it had subjected Wilson to bitter attacks from his political opponents. It was wholly in keeping with his theory of the function of the

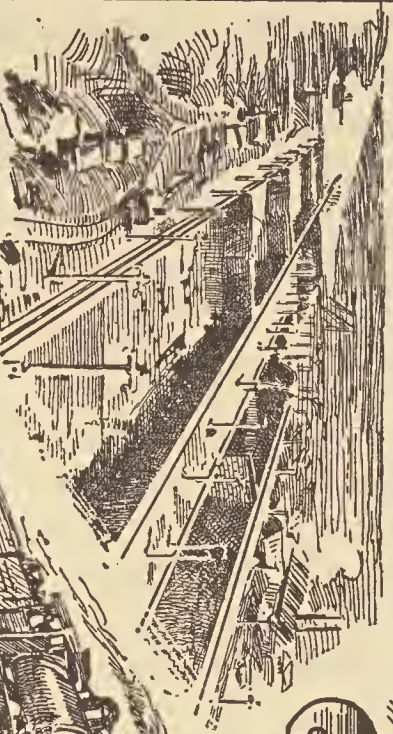
executive, which anyone may read in his thesis on *Congressional Government*. He conceives the executive as having a dual rôle—that of President of the United States and also head of the party he represents. Leadership should be exercised by the President, who must interpret the wishes of the people and be responsible to them. Efficiency is possible only when the President is backed by a congress in which his own party is dominant. Naturally, to the average voter the appeal was only an act of partisanship, and it cost the President something in prestige. The Congress which was to work with him for the rest of his term was Republican by a margin of two in the Senate and of forty-three in the House.

America and World Peace. With his usual disregard for precedent, the President announced that he would head the American delegation to the peace conference. In December he sailed for Europe, and so for the first time in American history a President visited a foreign nation during his term of office. Like many other acts, this one was greeted with storms of approval and of disapproval, but through it all the President went on his way, undisturbed by popular clamor. The other American delegates were Secretary of State Lansing, Henry White, diplomat, General Tasker H. Bliss, and Edward M. House, confidential adviser of the President.

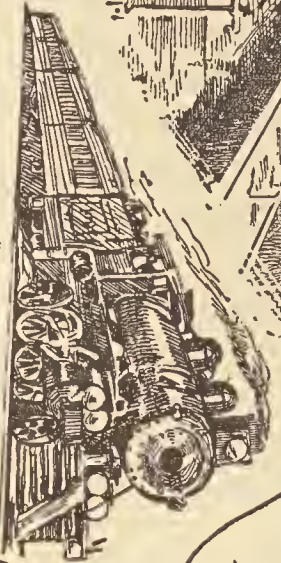
With the exception of a brief interval late in February, when he returned home to sign bills passed by Congress, the President remained in Europe until the last of June. On his first trip he visited Italy and England, receiving there and in France extraordinary ovations from the people. He took a conspicuous part in the Paris discussions leading up to the treaty with Germany, signed the treaty on June 28 in the Hall of Mirrors, in the Palace of Versailles, and reached home early in July. The treaty was presented to the Senate on July 10, the President at that time addressing the Senators on the subject of the league of nations, which had been made an integral part of the treaty.

During the President's absence formidable opposition in the Senate had developed to the provisions of the league of nations as formulated in Paris. It was argued that the independence of the United States was jeopardized, that the right of Congress alone to declare war was imperiled, that the United

1913 WILSON'S ADMINISTRATION 1921



Panama
Canal Completed



Federal Reserve
Districts
see article

Banks and Banking

Panama-Pacific Exposition



LEGISLATION.

- Tariff Currency Bill
- Tolls Exemption Repeal
- 17th Amendment Adopted
- Income Tax
- 18th Amendment Adopted

Railroads
Taken
by the
Government

Full or Presidential
Suffrage Given to
Women in— Illinois,
Montana, Nevada, New York, Nebraska,
North Dakota, Arkansas, Oklahoma, Texas,
South Dakota, Michigan, Maine, Vermont,
Minnesota, Iowa, Missouri, Indiana,
Tennessee

OTHER EVENTS

California Japanese
Land Bill - 1913
Floods in Ohio Valley - 1913
Hetch-Hetchy Reservoir
Act - 1913
Keokuk Dam Completed - 1913
Cape Cod Canal Completed
1914
Beginning of World War,
1914
U.S. Enters War,
1917

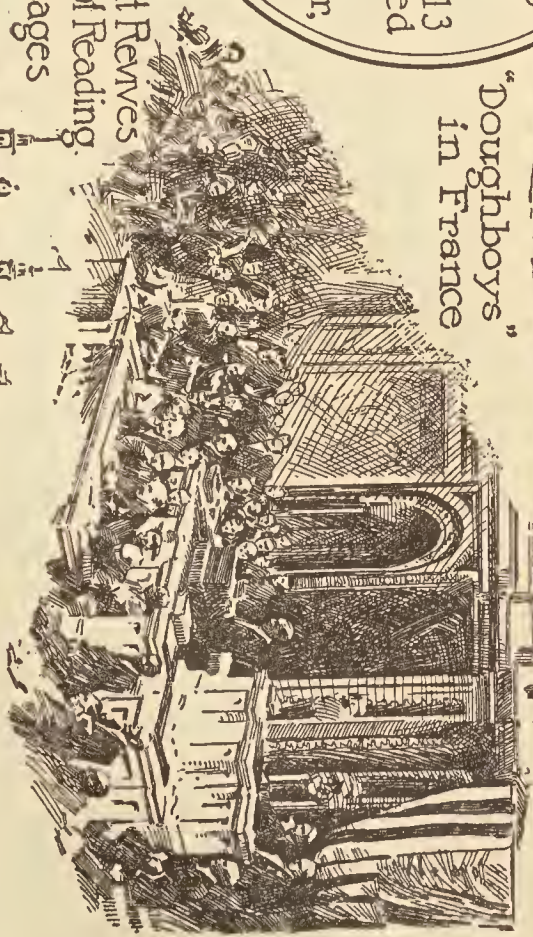


"Doughboys"
in France



Constitutionalist
Army Wins
Mexican
Revolution

President Remves
Custom of Reading
Messages



States would be drawn into petty European quarrels, that the Monroe Doctrine was menaced, etc. A long and bitter debate ensued, both in the Senate and among the people, but in the end the Senate refused to ratify the treaty and the league covenant. Wilson's health gave way under the strain, and when he gave up office in 1921 he was a sick man. He continued to reside in Washington as a private citizen, and kept up his interest and exerted his influence constantly in the cause of international peace. But physical strength did not return, and he died in Washington on February 3, 1924, and was buried in the crypt of Bethlehem Chapel. It was said of him that "he elevated the war into a moral crusade for the deliverance of oppressed peoples and for the destruction of an outworn social order." His legacy to America was a stronger sentiment for international coöperation and good will.

Other Events. International affairs had so prominent a place in the Wilson administrations that they obscured many events of domestic interest. Two amendments to the Constitution became effective, the XVIIth (1913), providing for the direct election of Senators, and the XVIIIth, making illegal the sale and manufacture of alcoholic liquor. The XIXth amendment, enfranchising women, was adopted by Congress in 1919 and submitted to the state legislatures for ratification; by September, sixteen states had ratified it. On July 1, 1919, the United States became temporarily a "dry" nation, in accordance with the terms of a war measure designed to conserve foodstuffs. The prohibition era was scheduled to last until the army was declared demobilized, the prohibition amendment not becoming effective until January 16, 1920.

Several other experiments were tried by the nation in this remarkable period of change. The government took control of the railroads, the telephone and telegraph systems and the cables, and operated them for varying intervals. Because of unsettled conditions it was difficult to judge adequately of the advisability of permanent government ownership. Another innovation was the establishment of daylight saving by moving all the clocks forward one hour on the 'ast Saturday in March and returning to standard time in October. The plan was adopted in March, 1918; it resulted in a great saving of fuel and was considered a

boon by city dwellers, who enjoyed thereby an extra hour of light at the close of day. Farmers opposed the system and an attempt was made to repeal the law during the special session of the Sixty-sixth congress. President Wilson vetoed the bill for the repeal; at that time there were not sufficient votes to override his veto, but repeal was accomplished in August.

Except for a few months after the outbreak of the World War, the United States enjoyed great prosperity during the Wilson administration. Business flourished, crops were large, and the Federal Reserve system kept financial conditions steady. To offset these favorable items were the high cost of living and unsettled labor conditions. Wages were high everywhere, but prices were correspondingly higher, and strikes for increases to meet advanced costs became alarmingly frequent during and after the war. The activity of radical elements who admired the Lenine régime in Russia also caused anxiety. Altogether, President Wilson was confronted by larger and more varied problems during his two terms than any other President since Lincoln. An event which caused general sorrow was the sudden death of Theodore Roosevelt, in January, 1919.

The White House Family. President Wilson was twice married. He and his first wife, Ellen Louise Axsen, of Savannah, Ga., were married in June, 1885, at the close of his student days at Johns Hopkins. She died on August 6, 1914, a few days after the World War began. The second Mrs. Wilson, who had been Mrs. Edith Bolling Galt, became mistress of the White House on December 18, 1915. Mrs. Wilson accompanied her distinguished husband to Europe in 1919. The three daughters of President Wilson created much quiet interest among Americans. The eldest, Miss Margaret, is a singer of note, and is active in social welfare work. During the war she sang for the soldiers in a number of communities in Europe. Jessie and Eleanor Wilson were both White House brides, the former marrying Francis B. Sayre, and the latter William G. McAdoo, former Secretary of the Treasury.

Woodrow Wilson, Author. For distinction of scholarship and charm of style Wilson's writings have a high place, though they do not show great variety as to subject matter. His *Congressional Government* and *The State* have already been mentioned. In 1893

Administration of Woodrow Wilson, 1913-1921

I. THE PRESIDENT

- (1) Ancestry
- (2) Birth
- (3) Education
- (4) Career as educator
- (5) Governor and President
- (6) Character
- (7) Writings

II. GOVERNMENT AFFAIRS

- (1) Domestic
 - (a) Underwood Tariff Law
 - (1) Revised tariff downward
 - (2) Income tax provisions
 - (b) Federal Reserve Act
 - (1) Twelve Federal Reserve banks created
 - (2) Stabilized financial conditions
 - (c) Clayton Anti-Trust Act
 - (d) Trade Commission Act
 - (e) Repeal of Panama Tolls clause
 - (f) Seventeenth Amendment
 - (1) Direct election of Senators
 - (2) In force, 1913
 - (g) Eighteenth Amendment
 - (1) Prohibition of liquor manufacture and sale
 - (2) Effective January 16, 1920
 - (h) Nineteenth Amendment
 - (1) Women enfranchised
 - (2) Adopted by Congress in 1919
 - (i) Daylight saving adopted
- (2) Foreign
 - (a) Mexico problem
 - (1) Refusal to recognize Huerta
 - (2) Tampico episode
 - (a) Occupation of Vera Cruz
 - (b) "ABC" mediators
 - (3) Villa raid on Columbus, N. M.
 - (a) Invasion by Pershing's troops

(b) Withdrawal of troops

(b) World War

- (1) Neutrality maintained until 1917
- (2) German aggressions against America
- (3) Diplomacy of President
- (4) Reëlection of Wilson in 1916

(c) United States enters the war, April 6, 1917

- (1) Conscription
- (2) Army in France
- (3) Liberty Loans successfully floated
- (4) Government operation of railroads
- (5) Armistice, November 11, 1918

(d) Peace Negotiations

- (1) President goes to Paris
- (2) Treaty presented to Senate
- (3) Controversy over league of nations

III. MISCELLANEOUS EVENTS

- (1) Completion of Panama Canal
- (2) Panama-Pacific Exposition
- (3) "War-time" prohibition effective July 1, 1919
- (4) Death of Theodore Roosevelt

Questions on Woodrow Wilson

Who were Woodrow Wilson's grandfathers?

Sketch his career as educator.

Why did he not continue the practice of law?

What was there unusual about his election as governor of New Jersey?

What precedents did Wilson ignore while President?

What amendments were proposed or became effective in his administrations?

In what ways was the Wilson era a period of change?

How long did he remain in Europe?

he published *Division and Reunion*, an account of American history from 1829 to 1889; the same year he brought out *An Old Master and Other Political Essays* and *Mere Literature and Other Essays*. His *History of the American People*, in five volumes, was published in 1902, and is one of the most readable narratives of its kind. Of more recent date are *The New Freedom*, *Guarantees of Peace* and *International Ideals*. The eloquent war messages of Woodrow Wilson are familiar to contemporary readers. Undoubtedly some of them will have a place in American literary annals with the utterances of Webster and Lincoln.

Related Articles. Consult the following titles for additional information:

| | |
|--------------------|----------------|
| Banks and Banking | Prohibition |
| Lusitania | Tariff |
| Mexico (history) | Woman Suffrage |
| Nations, League of | World War |

WILSON, WILLIAM LYNE (1843-1900), an American statesman and educator, born in Jefferson County, Va. He was graduated from Columbian College, Washington, D. C., studied at the University of Virginia and served in the Confederate army. Later he became professor of Latin at Columbian College and practiced law from 1871 to 1882, when he was chosen president of the University of West Virginia. In 1883 he entered Congress as a Democrat and served twelve years. As chairman of the Ways and Means Committee, he led the opposition to the Sherman silver purchase law and was the author of the famous Wilson Tariff Bill (see **TARIFF**): In 1895 he was made Postmaster-General by President Cleveland, and at the close of his term became president of Washington and Lee University.

WINCHELL, ALEXANDER (1824-1891), one of America's greatest geologists, who produced more than twenty volumes on geological topics and who taught for many years. He was born in Dutchess County, N. Y., and was graduated in Wesleyan University in 1847. Immediately he was appointed to the chair of physics and civil engineering at the University of Michigan, but was soon transferred to the geological department. He was a founder of the Geological Society.



WILLIAM L.
WILSON



WIND, movements of the atmosphere caused by unequal heating and the resultant inequality of pressure on different parts of earth's surface. The temperature is highest and the atmospheric pressure is lightest at the equator, while at the poles the temperature is lowest and the air most dense.

The heating of the air at the equator produces an upward current, which continues until the rising air reaches layers of atmosphere of the same density, when the vertical motion is changed to a horizontal one, and currents set in toward the poles. As the warm air over the equator rises, the cool air on either side moves in to take its place, so that there are in the equatorial regions two sets of currents, blowing towards the equator, and an upper current blowing towards the poles. When the upper current reaches the temperate latitudes it becomes of the same density as the air near the surface and descends, mingling with the surface currents. For this reason there may exist areas where for many consecutive days there is no wind.

Were it not for the rotation of the earth, these currents would blow directly north and south. As it is, each is deflected from its course. The wind blowing toward the equator enters regions having a greater velocity of rotation than those from which it came. It is unable at once to acquire this velocity and, as it were, lags behind, producing easterly winds.

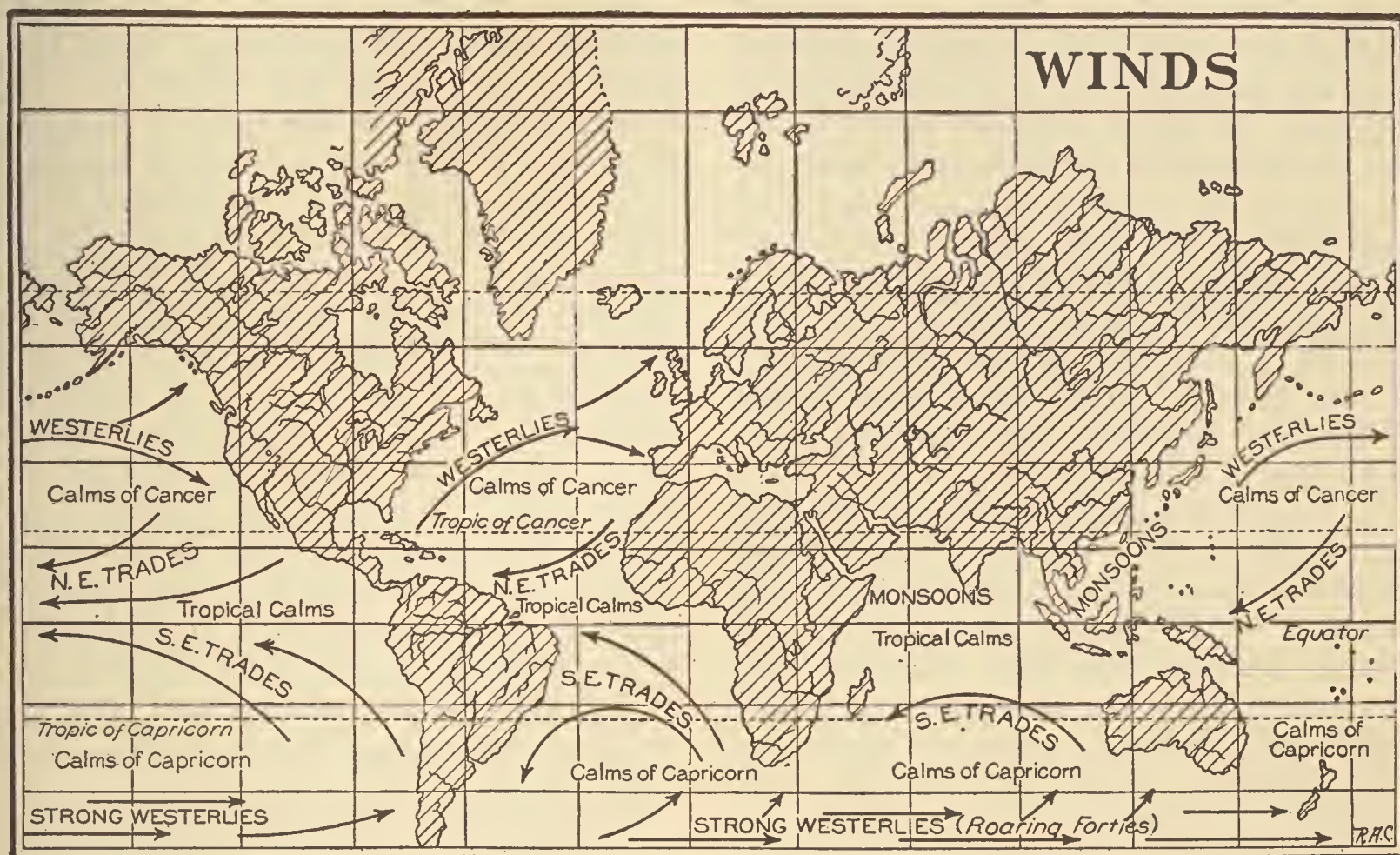
Winds blowing toward the poles are constantly entering regions having a lower velocity of rotation, and their eastward motion is greater than that of the land; hence they become westerly winds. In the northern hemisphere they blow from the southwest, and in the southern hemisphere, from the northwest.

In and near the tropics, these currents are quite regular, but as they approach the temperate latitudes and become nearer equal in temperature and pressure, they are subject to many local influences and become very irregular; hence no theory of wind which accounts for the general circulation of the atmosphere is sufficient to explain the prevailing winds in many localities, and the ac-

ounting for these is one of the most difficult problems with which the meteorologist has to contend.

A wind is named from the direction from which it blows; an easterly wind blows from the east, a westerly blows from the west. The

cylinder, several inches in diameter, with a square hole at each end, into which bars, called handspikes, can be inserted for turning it. As the roller is turned, it winds a rope or chain, which raises the weight. The windlass used for raising buckets of water from a well



force of the wind depends upon its velocity, which is determined by the anemometer, an instrument constructed of four hemispherical cups at the ends of horizontal bars, mounted on a vertical axis and attached to a registering system of clock work.

Related Articles. Consult the following titles for additional information:

| | |
|-----------------------|----------------|
| Calms, Regions of | Sirocco |
| Cyclone | Storms |
| Khamsin | Tornado |
| Land and Sea Breezes | Trade Winds |
| Monsoon | Typhoon |
| Norther | Weather Bureau |
| Prevailing Westerlies | Whirlwind |
| Simoom | |

WINDERMERE, *win'dur meer*, the largest lake of England, situated in Westmoreland and Lancashire counties, in the northwestern part of the country. It is ten and one-half miles long and about a mile wide. It contains seven islands, and has steep and rugged shores. The beauty of its scenery inspired Southey, Wordsworth and Coleridge.

WINDHOVER, *wind' huv ur*. See KESTREL.

WIND'LASS, a mechanical device for raising weights with little power. The windlass is a modification of the wheel and axle, and in its simplest form it consists of a mounted

has a winch at one or both ends of the roller. The lifting power of a windlass may be greatly increased by fitting a cog wheel between the cylinder and the winch. See DERICK.

WIND'MILL, a mechanical device which utilizes the energy of the wind for pumping water from wells, for grinding grain, cutting fodder for stock, for running churns, and many other purposes where a small amount of power is needed. The mill in general use on American farms has a wind wheel with radiating wooden or metal slats, placed close together and inclined, though not overlapping. This wheel rotates on a horizontal bar having at its opposite end a vane which keeps the wheel constantly facing the wind. The wheel is mounted on a frame twenty-five or more feet in height, to expose it to the wind's action. The speed of the mill is regulated by a gearing. The amount of power varies with the machine. There are mills which, under favorable conditions, furnish as high as four or five horse power. This type of mill is a distinct improvement upon the old-fashioned Dutch windmill, which has four radial arms covered with canvas. The latter is mounted

on a tower on wheels and is turned by hand when a change in direction of the wind makes it necessary to set the sails to the breeze.

WIN'DOW, an opening in the wall of a building, to admit light and air into the interior. In dwelling houses in ancient times the windows were narrow slits, and it was not until about the end of the twelfth century that glass was generally used in private houses in England. In Egypt windows were in common use in domestic and military architecture, but rare in the religious edifices. In Greece they were in use from ancient times, most of them being simple rectangular openings. Amongst the Romans, windows were very common, both in their private dwellings and in their temples. There was a great variety of form and decoration, and glass and transparent stones were used.

The window reached its highest development in the Gothic architecture, where it constitutes a distinguishing and characteristic feature. In this style, large pointed and circular windows were used, decorated with tracery and filled with beautiful stained glass, representing various designs, so as to rival wall paintings. This art of stained glass prevailed in France most extensively and also in England and Germany in the Middle Ages, but declined after the fifteenth century. It has been revived in the United States by the use of methods which enable the artist to excel even the finest effects of the Middle Ages.

In modern houses, windows are generally closed with clear glass, set in a frame, or *sash*, usually of wood or metal. They are often decorative, stained glass being used, and are made in nearly all styles. See **STAINED GLASS**.

WIND'PIPE. See **TRACHEA**.

WINDSOR, *win'zur*, ONT., in Essex County, on the Detroit River, directly opposite Detroit, and on the Canadian Pacific, the Canadian National, the Michigan Central, the Wabash, and Pere Marquette railroads. It is connected by ferry with Detroit and is the location of the Canadian branches of many large United States manufacturers. It is one of the principal centers in Canada for the manufacture of automobiles and drugs, and also has large steel mills, basket factories, and a salt refinery that is one of the largest in the Dominion. Windsor was first settled in 1812. Population, 1911, 17,829, in 1921, 38,591.

WINDSOR CASTLE, one of the most magnificent royal palaces in the world, situated at Windsor on the Thames, about twenty miles from London. Windsor was the residence of the Saxon kings before the Conquest.

William the Conqueror first built a royal residence there, and succeeding rulers have added to, torn down and rebuilt it. The present structure was completed in the reign of George IV. The castle consists of buildings surrounding two great courts, between which is the round tower, or keep, the oldest part of the structure, built by Edward III. Saint George's chapel, an imposing part of the castle is a fine example of Gothic flamboyant architecture. It has a vault, in which are buried many members of the royal family, among whom are Henry VI, Edward IV, Henry VIII, Jane Seymour, Charles I and George IV. Adjoining this is the Albert Chapel, one of the most beautiful memorial buildings in the world, built by Henry VII as a mausoleum. Under James II it was used as a Roman Catholic chapel, and after this it was neglected until George III rebuilt it as a royal tomb.

It was Queen Victoria who finished it in the most sumptuous manner, as a memorial to her husband, Prince Albert. Besides the private rooms of the royal family, there are in the castle richly furnished state apartments, containing many art treasures.

WIND'WARD ISLANDS, a group of islands of the West Indies embracing Saint Lucia, Grenada, Saint Vincent and a chain of smaller islands, all under a British governor-in-chief. The islands are so called because they are exposed on their eastern sides to the trade winds. See **LEEWARD ISLANDS**.

WINE, the fermented juice of fruits, particularly of grapes. The grape sugar contained in grape juice is readily changed through fermentation into alcohol. The process of manufacture is simple. To separate the juice the grapes are placed in a crushing machine having two corrugated cylinders which crush the grapes without crushing the seeds. The *must*, as the resulting mass of pulp is called, is then forced by pumps through hose to large wooden vats or tanks, where the fermentation takes place.

The fermentation is watched with the greatest care, for upon it depends the quality of the wine. It is hastened by raising the temperature or by placing in the must a small

quantity of fermented pulp from another vat. When the fermentation is completed, the juice is strained from the pulp and placed in large reservoirs, called *tuns*, where it remains until the wine is ripe. It is then drawn into casks or bottles and is ready for market.

Wines are known as *dry* when complete fermentation takes place and all the sugar is converted into alcohol. When fermentation is arrested while there is yet some sugar, the result is a sweet or fruity wine. A sparkling wine is one which effervesces when the bottles are uncorked. Champagne is a good illustration. In such wines fermentation has been arrested before all the carbonic acid has escaped. In color, wines are known as *red* or *white*. Red wines are produced by allowing the skins of the grapes to remain in the vat during fermentation. The amount of alcohol in wine varies from 16 to 25 parts in 100. In light wines it may be from 7 to 12 parts in 100.

Wines are manufactured in almost endless variety, and many of them are named from the locality in which they are made, such as Port, Burgundy, Bordellais and Rhenish wines. The leading countries in the world in the manufacture of wine are France, Spain and Italy. In the United States wine has been extensively manufactured in California. The national prohibition amendment (1920) dealt the industry a heavy blow.

Related Articles. Consult the following titles for additional information:

| | |
|-----------|-----------|
| Champagne | Port Wine |
| Grape | Sherry |

WINGED BULL, a type figure of ancient Assyrian sculpture. It was customary to place winged bulls with human heads before the entrances of royal palaces, as it was believed they guarded the buildings from enemies. Some of the larger bulls were seventeen feet high. The wings of the creatures were carved on huge plinths that covered the wall, while the body projected from the wall, the head and breast being outside the arch of the entrance.

WINGED LION, a famous piece of bronze sculpture representing a lion with wings. It is the emblem of Saint Mark, and was cast in 1178 for the embellishment of one of the two large columns at the south end of the extension to Saint Mark's Square, Venice.

WINGED VICTORY, or **NIKE OF SAM'OTHRACE**, a famous piece of antique sculpture, dug up in 1862 on the island of

Samothrace, in the Aegean Sea, and now in the Louvre, Paris. Nike, the Greek goddess of victory and winged messenger of Zeus and Athene, is here represented as standing on the prow of a ship, her transparent draperies whipped by the breeze. The statue, it is believed, was made to commemorate some military victory of the Greeks. It is badly mutilated, but what remains of it is treasured for its buoyant vitality, its sinuous grace and the noble dignity of its poise. See SCULPTURE.

WINKELRIED, *vin'kel reet*, ARNOLD, a Swiss patriot, who, if legend be true, brought about the independence of Switzerland. According to the popular story, at the Battle of Sempach, when the Swiss were fighting for liberty against their Austrian oppressors, Winkelried, who was only a poor peasant, conceived the idea of leading his countrymen in close triangular formation. By deliberately sacrificing their lives they drove a wedge into the enemy and thus made a breach which opened the way for a successful attack and victory.

WINNEBA'GO, an important Siouan tribe, now numbering about 2,000, who live in Wisconsin and Northeastern Nebraska. When the Jesuits met the Winnebagos, they held a broad tract in Central Wisconsin, near Green Bay and Lake Winnebago. They were a tractable people, but many of them died from the ravages of smallpox, and their numbers greatly diminished.

WINNIPEG, LAKE, a lake situated in the south-central part of Manitoba. It has an area of 9,459 square miles, and is a little larger than the state of Vermont. The southern half is in the form of a narrow arm, which extends southward to within about thirty miles of the city of Winnipeg. Its entire length is 260 miles, its greatest width about sixty miles and its greatest depth 100 feet. It receives the Winnipeg, the Red River of the North and the Assiniboine on the south, and the Saskatchewan on the west. Its outlet is by the Nelson River, which, after flowing through several small lakes, reaches Hudson Bay. The fisheries are the most important in Manitoba, yielding \$400,000 annually.

WIN'NIPEG, MANITOBA, the capital of the province, the county town of Selkirk County and the third largest city of the dominion, is situated at the confluence of the Assiniboine and Red Rivers. It is about 100 miles north

of the United States boundary and practically midway between Montreal and Vancouver. Its geographic position is unique; it lies in a great plain, midway between Lake Winnipeg and the international boundary, and is thus like a spout through which all the trade between eastern and western Canada must flow. It is entered by two great railway systems, the Canadian Pacific Railway, and the Canadian National Railway, and their repair shops are among the largest



WINNIPEG CITY HALL

industries of the city. The Great Northern and Northern Pacific lines give the city direct communication with Minneapolis and Saint Paul and other important commercial centers in the United States.

Winnipeg is a great wholesale center, and its manufactures are increasing in importance. It has over 1,200 factories, whose total annual output exceeds \$100,000,000. The wholesale trade in normal times averages \$200,000,000 a year. Over sixty buildings of the agricultural college were completed in 1920; there are a number of colleges including the University of Manitoba, Saint John's College, Wesley College, Manitoba College and Manitoba Medical College. The city is well built, with wide, regular streets and many beautiful buildings, among which

are the city hall, the postoffice, the parliament buildings, the courthouse, Carnegie Library, the new Fort Garry Hotel, Eaton's department store, two great railroad stations and the Hudson's Bay Company, McArthur, Sterling Bank and Ideal buildings.

The site of Winnipeg, in a rich river valley, early attracted settlers. The Hudson's Bay Company in 1812 erected Fort Douglas, which protected the colonists sent out by the Earl of Selkirk; these colonists were the first real settlers in Manitoba. Fort Garry, built in 1822 and rebuilt in 1835, was for years the seat of government in the Red River Valley. In 1873 the city of Winnipeg was incorporated. Its growth has been rapid, and it has enjoyed great prosperity.

In 1919 the most serious strike in its history occurred. Practically all of the union men stopped work, and for several weeks the situation was grave. The city government called for citizen volunteers to act as policemen, and they carried on public activities until the strike was broken. In 1870 the city had 215 inhabitants; in 1901 the population was 42,340; in 1911 it was 136,035, and in 1921, 179,087.

WINNIPEGO'SIS, LAKE, a lake in the southwestern part of the Canadian province of Manitoba, lying west of Lake Winnipeg and northwest of Lake Manitoba. It has an area of 2,086 square miles, and is 122 miles long and twenty miles in width at the widest part. Small boats can safely ply the lake, but numerous shallow places prevent navigation of large vessels. Its waters are stocked with whitefish and pike, and it is much in favor with anglers. The lake discharges into Lake Manitoba through the Waterhen River.

WINONA, MINN., the county seat of Winona County, 103 miles southeast of Saint Paul, on the Mississippi River and on the Chicago, Burlington & Quincy, the Chicago & Northwestern, the Chicago Great Western, the Chicago, Milwaukee & Saint Paul and the Green Bay & Western railroads. The city has good water transportation. It conducts a large trade in grain, lumber and live stock. Its industries include sawmills, railroad shops, flour mills, wagon works and manufactories of patent medicine, flax fiber, farm implements, shoes and candy.

A state normal school is located here, and the city has a seminary for young women, a business college and a public library. Prom-

inent structures include a Federal building, a courthouse, a city hospital, Watkins administration building and the Margaret Simpson Home. Winona is partially surrounded by bluffs of peculiar rock formation, Sugar Loaf and Trempealeau Mountains being especially picturesque. The place was settled in 1851, and the city was chartered in 1857. Population in 1920, 19,143, a gain of 3 per cent.

WINSLOW, JOHN ANCRUM (1811-1873), an American naval officer, commander of the *Kearsarge* in the battle between that vessel and the Confederate cruiser, *Alabama*, in 1864. The *Alabama* was sunk, and Captain Winslow, who had already won distinction in battle, was promoted to the rank of commodore. After the Civil War he commanded the Gulf squadron and later the Pacific squadron. He was made rear-admiral in 1870.

WINSTON-SALEM, N. C., the county seat of Forsyth County, 110 miles west of Raleigh, on the Norfolk & Western and the Winston-Salem Southbound railroads. The adjacent municipalities of Winston and Salem were consolidated to form the present city in 1913. Winston-Salem has the largest factory output of tobacco products of any city in America, amounting to 80,000,000 pounds per year and valued at \$45,000,000, or more than \$1,300 per capita for the entire population. Other industries include the manufacture of textiles, hosiery and underwear, furniture, wagons and blankets. Prominent educational institutions include the Salem Female Academy and the Slater Industrial Academy and Normal School. A Federal building, a Carnegie Library and the Salem Museum are among the principal buildings. Salem was founded in 1766 by the Moravians, and was governed for a time as a Church community. Population, 1910, 22,891; in 1920, 48,395.

WIN'TER, the season of the year between autumn and spring, beginning with the winter solstice, about December 22, and ending with the vernal equinox, about March 21. In the United States, the months December, January and February are commonly regarded as the winter months, although winter does not begin until December 21 or 22.

WIN'TERGREEN, a small plant, several inches high, which grows in the woods of the northern hemisphere. Glossy, oval leaves, green all winter, grow on the ends of reddish stems. Small white or pink flowers spring

from the base of the leaf stems and scarlet berries follow them. The leaves yield an oil which is much used for flavoring and for medicinal purposes.

WINTHROP, JOHN (1588-1649), one of the early colonial governors in America, and one of the most admirable characters in early American history. He was born at Edwinston, Suffolk, England, of wealthy parents, and was educated at Trinity College, Cambridge. Puritan zeal prompted him to share the fortunes of the colonists, and in 1629 he sailed to America with 900 emigrants as governor of the New England colony. From then until the time of his death he worked for the spiritual and material interests of his people.

Winthrop helped to organize the New England Confederation, and was its first president. His *Journal* is a valuable record of New England events from 1630 to 1649.

WIRE, metal drawn into an even thread or slender rod, usually cylindrical in form. The metals most commonly employed in the making of wire are gold, silver, copper and iron. The finest wire is made from platinum. Wire was formerly produced by hammering metal into plates which were then cut into strips and rounded by beating. In modern wire manufacture, steel or iron billets are heated in a furnace to white heat and put through several trains of rolls, emerging from the last roll about a quarter of an inch in diameter. These rods are wound on reels while still hot, are coiled, boiled in sulphuric acid for cleaning, washed in water, coated in lime, baked for two hours at low temperature, and then turned over to the wire drawer.

In order to draw these prepared rods into wires of smaller diameter, the workman pulls them through a series of steel dies by means of a cast-iron reel. Very fine wires may be drawn as many as twenty times, each time through smaller holes. As the process of drawing causes brittleness in wire, it must be annealed as occasion demands by heating in cast-iron pots, this process always being followed by an acid bath for cleaning. Wire used for small springs or nails, when hardness is an essential, is not annealed. For drawing very fine wires of gold, silver or platinum, dies of diamonds, rubies or other hard stones are used. Wire for outdoor use is galvanized to prevent rusting.

The uses of wire are innumerable, from the forming of the gigantic steel cable, with

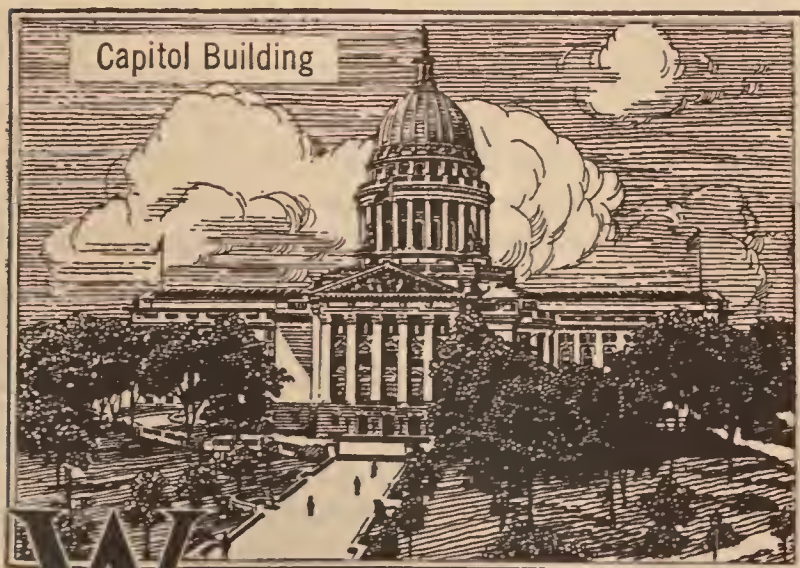
a tensile strength of 130 tons to the square inch, to the delicate micrometer of the telescope, employing platinum wires as fine as $\frac{1}{50,000}$ of an inch in diameter. Telephone and telegraph wires, trolley wires, wire netting and wire fencing are some of the most common uses. A sinister use during the war was that made of barbed wire enmeshed into an impenetrable network to hinder enemy advance. The United States army alone used 100,000 miles of barbed wire in its campaigns in France. American factories sold over 2,000,000 miles of this wire to the allied nations from 1915 to the date of the armistice in November, 1918.

WIRE GLASS, window glass made with an inside mat of open mesh wire. The wire is embedded in the molten glass at a temperature sufficiently high to insure adhesion of the glass to it. The surface of the pane can be finished in such style as to adapt the glass for different uses. It may be ribbed, polished or "rough rolled." Wire glass is strong, and is used for window panes where ordinary glass is apt to be broken. It is one of the most efficient safeguards against fire, since, if broken by heat, it does not fall. Two men claim the invention of wire glass, Frank Schuman of Philadelphia and Leon Appert of France.

WIRELESS TELEGRAPH. See TELEGRAPH, WIRELESS.

WIRELESS TELEPHONE. See TELEPHONE, WIRELESS.

WIREWORMS, *wire'wurms*, a name given by farmers to the larvae, or grubs, of several species of click beetles. The worms are said to live for years, during all which time they are destructive to vegetation. See CLICK BEETLE.



WISCONSIN, a north-central state of the American Union, one of the foremost American commonwealths in educational and

political matters, and industrially one of the most prosperous. Wisconsin is popularly called the *Badger State*, referring to the habits of the lead miners in early days, who lived in rude dugouts, after the fashion of the badger. The name *Wisconsin* is of Indian origin, and has been variously interpreted to mean *rushing river* and *great rocks*. The flower emblem of the state is the violet.

Location, Area, Population. Wisconsin lies north of Illinois and east of Minnesota and Iowa; nearly all of the western boundary is formed by the Saint Croix and the Mississippi rivers. A good portion of the eastern boundary line lies in Lake Michigan; the state adjoins the state of Michigan on the northeast, and at the extreme north it follows the shore line of Lake Superior. With a maximum length of 315 miles and a width of 294 miles, the state is irregularly oblong in shape and has an area of 56,066 square miles; of this total 810 square miles are water. Twenty-four states surpass it in area, and twelve in population. In 1920 the population was 2,632,067, representing an average density per square mile of 47.6. In Jan., 1910, according to Federal reports, the population was 2,332,860. Wisconsin has about four times as many inhabitants as Rhode Island the most densely-populated state, but it is about forty-five times as large as that smallest commonwealth. Nevada, which is twice the size of Wisconsin, and the least populous of the states, has about one-twentieth as many inhabitants. Among the neighboring states Iowa is nearest Wisconsin in size, having an area but eighty-one square miles greater. Illinois is about 600 square miles larger.

People and Cities. The state has a large percentage of foreign-born inhabitants, as these make up about one-fourth of the population. Germans are the most numerous, followed by Norwegians, Austrians, Russians and Swedes. Less than half the people live in cities or towns of 2,500 or more inhabitants. There are twenty-one cities with populations exceeding 10,000. Milwaukee, the largest city with a population reported as 457,147 in 1920, was in that year the thirteenth city in the Union in size. The next five cities, according to the census, are as follows: Racine (58,593), Superior (39,624), Oshkosh (33,162), Kenosha (40,472), and Green Bay (31,017). The state capital is Madison (38,378).

About fifty per cent of the inhabitants are Roman Catholics, and over one-fourth are Lutherans. Other prominent denominations are the Methodist, Congregational, Baptist, Presbyterian, German Evangelical and Episcopalian.

Surface and Drainage. The surface of Wisconsin is generally a great rolling plain. A low height of land extends through the state north and south, a little east of the middle line, and at a point about thirty miles south of Lake Superior it meets another elevation extending east and west. The highest altitudes of this ridge are about 1,800 feet. These ridges form watersheds, from which the land slopes in all directions. There are no high mountains, but the rivers flow through well-worn valleys in some localities, and along the Mississippi and other streams there are bluffs. There is also a considerable bluff along Green Bay. The lowest part of the state borders on Lake Michigan, which is a little less than 600 feet above sea level.

Wisconsin is divided into three drainage areas. The northwestern part of the state is drained into Lake Superior by a few short rivers, chief of which are the American and the Boise Brulé. The portion east of the watershed extending north and south is drained into Lake Michigan, and with the exception of the Fox, all of the rivers in this drainage area are short. Some of the most important are the Menominee, forming a good part of the boundary between Wisconsin and the northern peninsula of Michigan, the Peshtigo and the Oconto.

Nearly three-fourths of the state is drained into the Mississippi River. The chief tributaries are the Saint Croix, forming a part of the western boundary, the Chippewa, the Black and the Wisconsin, which flows through the central part of the state and is the largest river wholly within its boundaries. Each of these rivers has numerous tributaries, but none of them is navigable for large boats. Through a part of its course the Wisconsin has cut its way through sandstone bluffs, forming the Dalles, noted for their beautiful scenery. In the southeastern, north-central and northern parts of the state are numerous lakes, which are favorite resorts for summer residence and also for hunters and fishermen. The largest of these is Lake Winnebago, almost directly south of Green Bay. Lakes Geneva and Mendota are noted for their beautiful landscape setting. The former is

a popular summer resort; on the latter is the city of Madison, seat of the state university.

Climate. The winters are long and severe, but of uniform temperature, with many dry, clear days; the summers are short and hot. But the cold of winter and the heat of summer in the eastern section are tempered by the waters of Lake Michigan. In northern Wisconsin, snow usually falls early in the winter and covers the ground until late in the spring; in the south there is often little snow. The average rainfall is thirty inches; the mean temperature at LaCrosse is 44°. During the summer season thousands of visitors seek the state to enjoy its attractive lakes and woodlands and healthful climate.

Mineral Resources. Though the state derives a much greater income from agriculture than from mining operations, it has valuable deposits of zinc, building stone, iron ore and clays. Zinc, the most valuable product, occurs in the southwestern section, and in the output of this mineral the state ranks fourth in the Union. The value of the yield increased from \$3,173,526 to \$15,223,204 between 1914 and 1916. The most important building stones are granite, limestone and sandstone, and the annual value of the output is about \$2,400,000.

Iron ore is found in the valley of the Menominee River and along the Gogebic range in the northern part of the state. The deposits are a continuation of those in Michigan and Minnesota, and the ores are similar in quality. In quantity of output, however, Wisconsin is far behind Michigan and Minnesota, and it produces only about one-third as much as Alabama, the state third in order. The annual output is valued at about \$2,200,000; pig iron valued at nearly \$4,000,000 is produced. Clay suitable for making brick and tiling is widely distributed, and the manufacture of cream-colored brick is one of the important industries of the state. Other minerals of value include lead, natural rock cement, graphite and mineral waters.

Agriculture. Originally a large part of the state was covered with forests. In the north these were pine, and the intervening regions consist of marsh or land covered with boulders; hence this part of the state is not well suited to general agriculture, but it is well adapted to dairying, and that industry has been extensively developed. The middle and southern portions consist of fertile prairie lands. They are supplied with an abundance

of moisture, and the temperature is suitable to growing all crops produced in a medium or cool temperate climate; hence all of the central and southern part of Wisconsin is under tillage and produces abundant crops.

Oats and corn are the most important grain crops; the annual harvest of oats is approaching the hundred-million bushel mark. In this produce Wisconsin is the fourth state in the Union. About 4,500,000 tons of hay are produced a year, over 2,600,000 acres being devoted to this crop. Barley and rye are also raised in large quantities, and buckwheat is another important product. In the central part of the southern group of counties is a fertile tobacco belt, Wisconsin ranking seventh among the states in amount of tobacco raised. Sugar beets, potatoes, beans, peas, apples and small fruits are other flourishing products. The state is one of the few regions in America producing cranberries on a commercial scale, and it is one of the first five states in the production of peas and beans.

Dairying is one of the most profitable lines of agriculture, and Wisconsin produces more butter than any other state. New York alone exceeds it in output of milk. In January, 1920, there were 1,795,000 milch cows and about 1,000,000 other cattle.

Manufactures. According to statistics compiled by enumerators of the Thirteenth Census, Wisconsin ranks eighth among the states in manufacturing. Abundant water power, proximity to good markets, excellent railroad facilities and a wealth of natural resources have all aided in the development of industry. The most important is the making of lumber and lumber products. While the forest section is in the north, the mills are widely distributed, and the annual output of the industry is valued at over \$60,000,000. Foundry and machine-shop products are next in order, including agricultural implements, carriages and automobiles.

In the cities along the Wisconsin and Rock rivers there are many thriving establishments devoted to the making of butter, cheese and condensed milk, the products third in rank. Tanning, flour and grist milling, slaughtering and meat packing, the canning of vegetables, paper making and shipbuilding are other flourishing industries, and before the prohibition era Milwaukee was one of the leading cities in the world in the manufacture of beer. Milwaukee, Racine, Kenosha, Sheboygan, LaCrosse, Appleton and Superior are

the chief manufacturing centers. At the Thirteenth Census Wisconsin ranked first in the making of butter, cheese and condensed milk, horse clothing, straw goods and enameled wares. In the manufacture of leather gloves, cement, carriages and wagons, saws and windmills, it was second, and it was third in output of glass, steam railway cars and musical instruments.

Transportation and Commerce. The western part of the state has an outlet through the Saint Croix and the Mississippi, and the northwestern section, through Lake Superior, while the eastern portion, bordering its entire length upon Lake Michigan, has communication with the Great Lakes through Racine, Milwaukee, Sheboygan, Manitowoc, Sturgeon Bay and a number of other points. The state is well supplied with railways, there being about 7,500 miles of steam railroad within its borders, besides about 900 miles of electric lines. The leading railroads are the Chicago, Milwaukee & Saint Paul, the Chicago & North Western, the Wisconsin Central, the Minnesota, Saint Paul & Sault Sainte Marie, the Green Bay & Western, the Chicago, Burlington & Quincy and the Northern Pacific. A canal connects the Fox and Wisconsin rivers at Portage, and a canal at Sturgeon Bay connects Green Bay with Lake Michigan. Wisconsin has 12,000 miles of surfaced roads.

The commerce of the state is extensive. Iron, dairy products, live stock, lumber and its manufactured products, flour and grist mill products, potatoes and other vegetables are exported in large quantities. The imports consist of manufactured goods and machinery. Milwaukee is the chief center of trade on Lake Michigan and for the state at large, while Superior is the chief commercial center for the northwestern part of the state.

Government. The legislature consists of a senate and a house of representatives, the senate having thirty-three members, and the house, 100. The members of the assembly are elected for two years; of the senate, for four years. The sessions are biennial and are unlimited as to time. The executive department consists of a governor, a lieutenant-governor, a secretary of state, a treasurer, an attorney-general and an insurance commissioner, each elected for two years, and the state superintendent, elected at a spring election for four years. The courts consist of a supreme court of seven judges, elected for ten

years, and circuit courts in the judicial circuits established by the legislature, each circuit having one judge elected by the people. Local administration is by counties.

Education. Wisconsin expends over \$13,000,000 annually on its public schools, and maintains one of the best systems in the Union. The state board of education consists of the governor, the secretary of state and the state superintendent of public instruction. The University of Wisconsin at Madison is at the head of the system, and is directly affiliated with the high schools throughout the state. There are also normal schools at Milwaukee, Oshkosh, Plattville, River Falls, Stevens Point, Superior, Whitewater and La-Crosse. Wisconsin was the first state in the Union to establish a system of county training schools for the preparation of teachers for the country schools; it was also the first to establish county schools of agriculture and domestic economy for rural communities. Schools of both types are being established from year to year. In connection with its educational department, Wisconsin maintains an excellent system of school libraries, which are so managed as to bring a large list of the best books within reach of every inhabitant of the state, at practically no expense. The traveling libraries have no connection with the educational department, being promoted by the state library commission. The library of the historical society at Madison is also one of great value. Another agency for extending popular education is the excellent extension system of the state university (see WISCONSIN, UNIVERSITY OF).

Important institutions of higher learning not under control of the state include Beloit College at Beloit; Lawrence University at Appleton; Ripon College at Ripon, Milton College at Milton and Milwaukee-Downer College at Milwaukee.

Institutions. The school for the blind is at Janesville; that for the deaf and dumb is at Delavan; the school for the feeble-minded is at Chippewa Falls, and the state public school for dependent children is at Sparta. There are hospitals for the insane at Mendota and Winnebago and a hospital for the criminal insane at Waupun; the incurable insane are cared for in county institutions which receive state aid. A state tuberculosis sanitarium was established at Wales in 1905, and a home for the feeble-minded and epileptic in Racine County in 1916.

Items of Interest on Wisconsin

As Wisconsin was the last state made out of the Northwest Territory, it was given all the area left, 56,066 square miles.

Wisconsin's climate is marked by much sunshine and high temperature in summer and by clear sky with low temperature in winter; the climate is tempered to a limited degree by the large bodies of water east and north.

Many of the wild animals have been killed off, but deer are still plentiful in the northern part of the state, and wolves, black bears and foxes are occasionally seen; waterfowl of all kinds is abundant and fishing is both a great sport and an important business.

In Grant County there is a huge mound shaped like an elephant, with a trunk thirty-one feet long. This is a relic of the Mound Builders of prehistoric times.

Wisconsin's many lakes, waterfalls and rapids are the result of glacial action.

School attendance is compulsory for all children between the ages of seven and fourteen, in cities for the entire school year, and in towns and villages for six months.

Before the era of white settlement the territory was inhabited by Potawatomis.

The highest point in the state, Rib Hill, is in Marathon County. It has an altitude of 1,940 feet.

Questions on Wisconsin

Describe briefly the surface and drainage of Wisconsin.

Name five important agricultural products and four minerals.

What can you say about the importance of dairying in Wisconsin?

What is the most important manufacturing industry?

Name five other manufacturing industries.

Name five important agricultural institutions.

Explain, as fully as you can, Milwaukee's importance in commerce and manufactures.

There is a state soldiers' home at Waupaca and a national soldiers' home at Milwaukee. The penal and reformatory institutions consist of a state prison at Waupun, a state reformatory near Green Bay, an industrial school for boys at Waukesha, a house of correction and industrial school for girls at Milwaukee, and an industrial home for women in Fond du Lac County.

History. Probably the first white man to enter the territory of Wisconsin was Jean Nicolet, who was dispatched in 1634 by Champlain and traversed the southern part of the state. Other traders and missionaries followed, including Radisson and Groseilliers, Father Allouez and Marquette and Joliet. Meantime, several missions had been established, one at La Pointe on Lake Superior in 1665 and one at the site of De Pere in 1669. By the Treaty of Paris, in 1763, the territory, with all the northwest was transferred to Great Britain and, after the Revolution, to the United States, where it formed a part of the Northwest Territory. However, the French and Indians in the region still remained hostile to the United States and fought against it during the War of 1812. The discovery of lead mines led eventually to rapid influx into the territory, and after the defeat of Black Hawk there was a large agricultural immigration.

Wisconsin was successively joined to Indiana, Michigan, Illinois and again to Michigan Territory, and it was erected into a separate territory in 1836. In 1847, the population of the state having been vastly increased, a constitution was adopted, and Wisconsin was admitted to the Union in the following year. For a time the chief incident in the political history of the state was the scandal arising from the promiscuous granting and sale of public lands to railroads. One of the first movements leading to the Republican party was a convention at Ripon, Wis., in 1854. The state was consistently opposed to slavery, and its supreme court declared that the Fugitive Slave Law was unconstitutional in the state. During the Civil War, Wisconsin furnished more than its quota. Since that time large areas have twice been devastated by forest fires, but the state has otherwise enjoyed phenomenal prosperity. It has been almost consistently Republican in politics.

Within recent years many progressive laws have been passed, including workmen's com-

pensation, mothers' pension and child labor measures and a law regulating campaign contributions. In 1913 there was enacted a law requiring a physical examination for all men who applied for marriage licenses. This was subsequently upheld by the state supreme court. Women were given Presidential suffrage in advance of the passage through Congress of the suffrage amendment.

Related Articles. Consult the following titles for additional information:

| CITIES | | |
|---------------------|-------------------|-----------|
| Appleton | Kenosha | Racine |
| Ashland | La Crosse | Sheboygan |
| Beloit | Madison | Superior |
| Eau Claire | Manitowoc | Waukesha |
| Fond du Lac | Marinette | Wausaw |
| Green Bay | Milwaukee | |
| Janesville | Oshkosh | |
| PHYSICAL FEATURES | | |
| Dalles | Mississippi River | |
| Great Lakes | Wisconsin River | |
| HISTORY | | |
| Black Hawk | Ordinance of 1787 | |
| Northwest Territory | | |

WISCONSIN, UNIVERSITY OF, one of the largest and most progressive of the American state universities, established at Madison in 1838.

The university stands at the head of the educational system of the state and gives free tuition to students who are residents of Wisconsin, in all departments, except in the summer term. Through an admirably-equipped and organized extension department thousands of persons unable to attend regular university sessions are given exceptional educational advantages. The university maintains three colleges, five schools and two divisions—colleges of letters and science, engineering and agriculture; schools of law, medicine, music, the graduate school and the library school; divisions of physical education and university extension.

The library building is one of the finest in the United States, and contains the university library of 276,000 volumes; the library of the Wisconsin State Historical Society, 192,000 volumes, and the library of the Academy of Sciences, Arts and Letters, 5,000 volumes, beside thousands of valuable documents and pamphlets. During the regular session there are about 8,000 students in residence; the total yearly enrollment is about 10,000. There is a faculty of nearly 1,000. The university owns property and equipment valued at over \$5,000,000.

WISCONSIN RIVER, the principal river of the state whose name it bears. It rises near the boundary between Michigan and



ARBUTUS



BARLEY

WISCONSIN

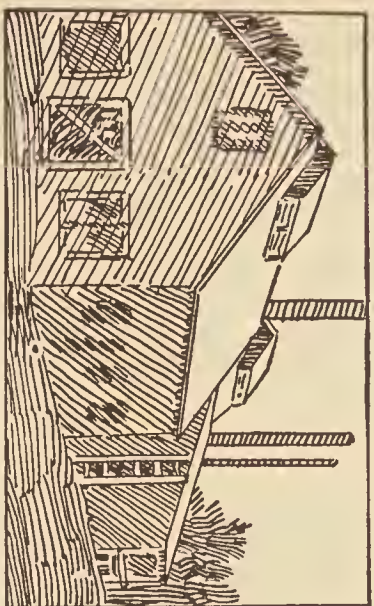
THE BADGER STATE



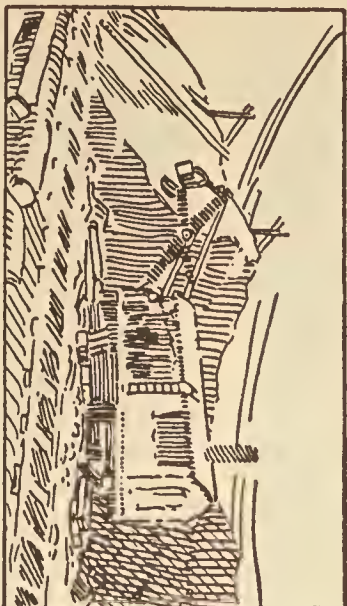
RYE



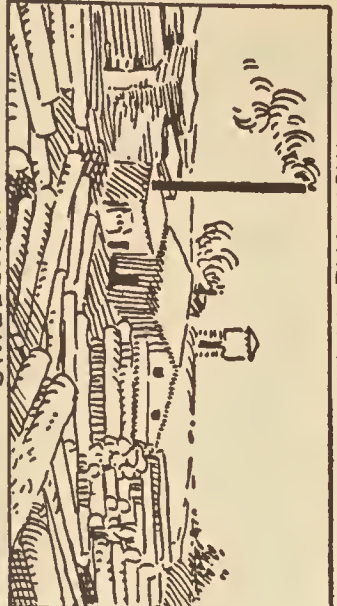
ARBUTUS



CONDENSED MILK CO.



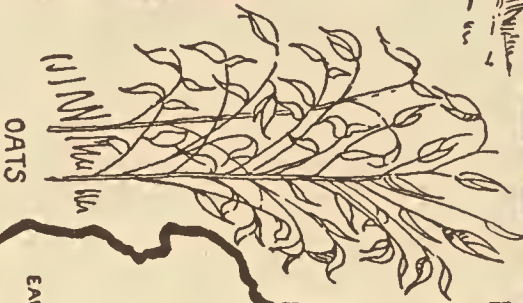
IRON ORE MINING



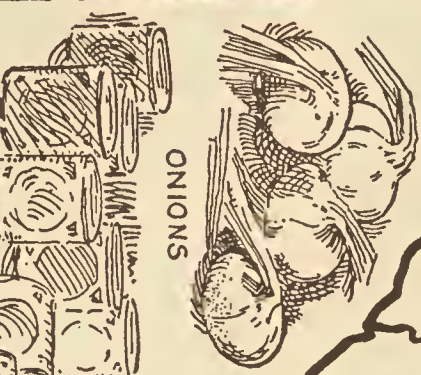
LUMBERING



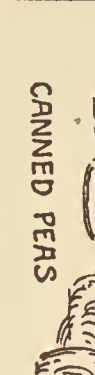
BUILDING STONE



OATS



ONIONS



CANNED PEARS



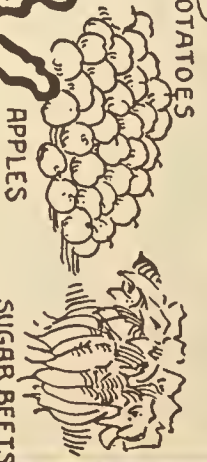
SWINE



DAIRY COWS



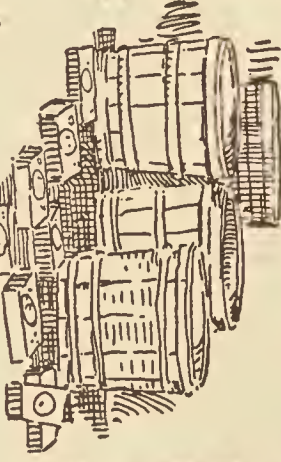
HAY



APPLES



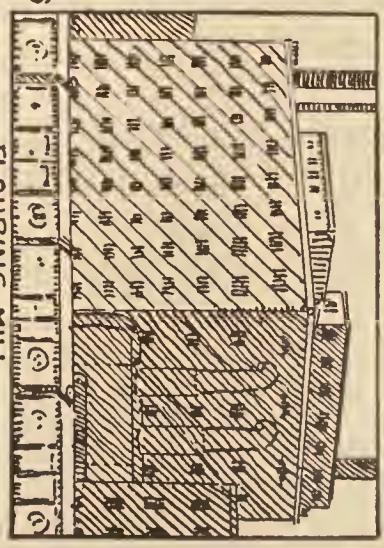
CABBAGES



BUTTER



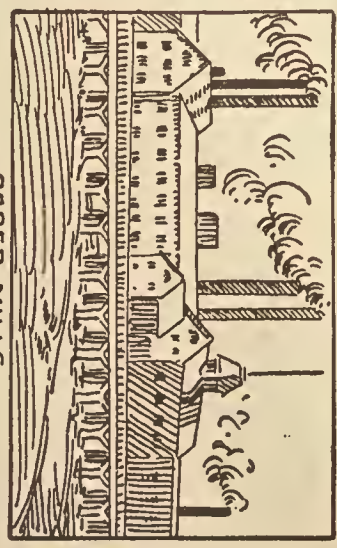
CHEESE



FLOURING MILL



TOBACCO FIELD



PAPER MILLS



FISH

Wisconsin, flows southward to Portage City, thence in a southwest direction, entering the Mississippi River four miles south of Prairie du Chien. Its length is about 600 miles, and it is navigable for steamboats to Portage City, about 200 miles. Here a canal connects it with the Fox River. Its passage through some deep gorges forms the celebrated Dalles, near Kilbourn City.

WISTA'RIA, a climbing shrub of the pea family, native to China and North America. Several varieties have been introduced into England. When in flower they are among the most ornamental of garden plants. The flowers, shaped like pea-blossoms, are of various tints and shades of lavender, and hang in clusters which sometimes are several feet long. The Chinese and American species are much used in the United States for garden ornament.

WIS'TER, OWEN (1860-), an American novelist and story-writer, born in Philadelphia and educated at Harvard. He was admitted to the bar, but after two years gave up law work for literature and won wide notice through his stories of Western life. Of these *The Virginian* has been most popular. Wister has written biographies of *Ulysses S. Grant*, *Oliver Wendell Holmes* and *Benjamin Franklin*, and he has contributed to magazines both short stories and verse. Among his later books are *Lady Baltimore*, *The Simple Spelling Bee*, *The Seven Ages of Washington*, *Members of the Family* and *The Pentecost of Calamity*.

WITCH'CRAFT At all times in the world's history there has existed a belief that some persons, in league with powers of darkness, had powers to cast "spells" or inflict injury at a distance by supernormal means. This belief became general in the fifteenth, sixteenth and seventeenth centuries, and in England and America the use of the supposed power to harm through coöperation of a demon was called *witchcraft*, meaning *craft or practice of a witch*.

Women were most often accused of witchcraft, though men and even children were suspected. Laws were passed to deal with them and persecutions were numerous. It is estimated that in England, Germany, France, Spain and Italy 100,000 innocent persons perished under the charge of witchcraft between the middle of the fifteenth and the middle of the sixteenth century. Various tests were applied to ascertain whether or

not the person was a witch, such as pricking the body of the victim all over, to find the insensitive spots protected by the devil, and throwing witches into deep water, under the presumption that they would float if possessed.

The witchcraft frenzy broke out among the Puritans of New England in 1648. In Salem, Mass., Cotton Mather, a clergyman of wide influence and great power as a pulpit orator, wrote a work entitled *Memorable Providences Relating to Witchcraft and Possessions* and another entitled *Wonders of the Invisible World*. By the distribution of his writings and his utterances in the pulpit, he succeeded in arousing the superstition to the highest pitch, at a time when it was beginning to abate in Europe.

Many of the teaching men of the province were influenced by his writings and sermons, and, as clergmen in those days constituted a part of the magisterial authority, he succeeded in procuring the execution of nineteen persons. The good sense of the Puritans at last revolted against these atrocities, and a reaction set in. Samuel Parris, a clergyman, who was one of the chief persecutors, made a confession; others also relented, and there were no more persecutions for witchcraft in the American colonies. In England the last trial for witchcraft was in 1722, and it resulted in acquittal.

WITCH HA'ZEL, a North American shrub which is of economic importance as the source of a healing lotion obtained by distilling the leaves in alcohol. The plant has branches of a very peculiar appearance, for they twist and curve in all directions. In olden times the witch hazel was believed to have supernatural power, and the forked twigs were used as divining rods. The plant does not bloom until late in the fall, and the fruits ripen the following year. The yellow flowers grow in showy clusters. A small, woody capsule encloses the seeds.

WITENAGEMOT, *wit e nah ge mote'*, in English history, the name given to the old Anglo-Saxon assembly, which consisted of the king, the ealdormen, the higher ecclesiastics and the thanes. This body had power to elect the king, when a succession was in dispute, or to depose a king if it saw fit, to make treaties, to collect revenue and to enact laws. Under a weak king it was able to exercise all of these functions, but a strong king might easily make most of them merely

nominal. The Norman Conquest put an end to this assembly, and the Parliament which grew up later in England was a separate institution, though it had its roots in this early body.

WITNESS, in law, (1) one who signs his name as affirmation of the genuineness of another's signature; (2) a person who gives testimony under oath in a judicial proceeding. Any person can be summoned before a court to give evidence. If he fails to appear he is liable to punishment for contempt (see **CONTEMPT**). The summons by which he is ordered to appear is called a *subpoena*; if he is ordered to bring a document or other thing in his possession, he is summoned by a *subpoena duces tecum*, meaning *bring with you under penalty*.

WITTE, *vit'te*, SERGEI YULIEVITCH (1840-1915), a Russian statesman and diplomat, born at Tiflis. After his graduation from the New Russian University at Odessa, he took up journalism; later he was engaged by the government in railway service. In the Russo-Turkish War Witte had charge of the transportation of troops on the Odessa railway and so distinguished himself that at the close of the war he was made manager of the Southwestern Railway of Russia. Two years later he became chief of the Imperial Railway department and president of the tariff commission. His next promotion was to the office of Minister of Finance, in 1893. His policy in this office led to the rapid development of manufacturing industries in Russia. He introduced the gold standard, made the sale of alcohol a government monopoly, concluded several important commercial treaties, especially with Germany, and made large foreign loans, whereby the Trans-Siberian Railway could be built. In 1903 a strong opposition arose and Witte was removed from power and made president of the Committee of Ministers. At the Treaty of Portsmouth, N. H., at the close of the Russo-Japanese War, Witte was especially prominent. When he returned to Russia, the czar conferred upon him the title of count. In 1905 he was appointed Prime Minister of Russia, but in 1906 he resigned this position.

WITTENBERG, *vit' ten berK*, GERMANY, a town in the province of Saxony, Prussia, situated on the Elbe, fifty-nine miles southwest of Berlin, of special historical interest because of its association with Luther and Melanchthon. It was to the door of the

Schlosskirche at Wittenberg that Luther nailed his celebrated theses, and within this church both Luther and Melanchthon are buried. (See **LUTHER**, **MARTIN**; **REFORMATION**). The town contains a number of educational institutions, in one of which, the University of Wittenberg, Luther for a time was instructor. The industries include the manufacture of woolen and linen goods, hosiery, machinery, pottery, etc. Population, about 20,000.

WOAD, *wode*, a group of plants of the mustard family, chiefly natives of the Mediterranean region. *Dyer's woad*, a species yielding a blue dye, was formerly much cultivated. This has been superseded by indigo; but a fine blue is still obtained by mixing the two. The leaves when gathered are reduced to a paste, fermented for two weeks, made into balls, sun-dried, and subjected to further fermentation.

WODEN, *vo'den*. See **ODIN**.

WOLF, a carnivorous animal, allied to the dog. The common European wolf, found almost everywhere in North America, also, is yellowish-gray, with a blackish band, or



WOLF

streak, on the fore legs. The ears are erect and pointed. The hair is harsh and strong, the tail straight, bushy and drooping. The height at the shoulder is about two and a half feet. The wolf is swift of foot and crafty, a destructive enemy to sheep and poultry. It runs in packs, to hunt the larger quadrupeds, such as deer and elk. When hard pressed with hunger, these packs have been known to attack isolated travelers and even to enter villages and carry off children.

In general, however, wolves are cowardly and stealthy. They are still plentiful in some parts of Europe and the United States. They probably ceased to exist in England about the end of the fifteenth century. The small *prairie wolf* or *coyote*, living on the western plains of the United States, is a burrowing animal.

WOLFE, JAMES (1727-1759), a British general, whose victory in the Battle of Quebec, September 13, 1759, won Canada for Great Britain. Wolfe was born at Westerham, Kent, England. He entered the army early and served in Scotland and in Flanders. When it was decided, in 1758, to send an expedition to Cape Breton, Wolfe was appointed by Pitt brigadier-general. He advised an attack on Quebec and was selected to lead the enterprise, in which capacity he showed wonderful courage and genius. After having been driven back from the fortress, he led his men, by night, up a steep, narrow path, to the Heights of Abraham, above the city, and here he met the French under Montcalm. While leading a charge, he had one of his wrists shattered by a shot, but he did not stop. Another shot struck him, and he still advanced, but a third lodged in his breast and proved fatal. His last words, when he was told that the French were retreating, were, "Now God be praised; I die in peace." A monument on the battlefield bears a simple inscription in honor of the conqueror.

For a biographical sketch suitable for school use, see Biography, pages 440-442.

WOLF FISH, a savage fish, that has a mouth armed with sharp, strong teeth. When captured, the fish is said to bite the nets and even to attack the fishermen. Around the coasts of Great Britain it attains a length of six or seven feet, but in more southern seas it grows to a still larger size. In Iceland the natives eat the flesh and make the tough skin into a sort of leather suitable for purses, bookcovers and the like.

WOLSELEY, woolz'ly, GARNET JOSEPH, Sir, Viscount (1833-1913), a British general, born in Ireland. He entered the army as ensign in 1852, took part in the second Burmese War, where he was severely wounded, and served with distinction in the Crimean War. He engaged in the siege and capture of Lucknow during the Sepoy Rebellion, and was in command in 1860 in the Chinese War. In the following year he was dispatched to Canada, and in 1870 he carried the Red

River expedition to a successful issue. Three years afterward he was appointed to the command of an expedition to punish the king of Ashanti, and after a brief campaign he entered Kumassi and subdued the king. He was publicly honored and given a grant by the government of \$125,000.

He was placed in command in Egypt, in 1882, where his forces successfully stormed the lines of Tel-el-Kebir and captured Arabi Pasha. For this he received the thanks of Parliament, was created a baron and was promoted to the rank of general. In 1882 he was sent to Egypt to rescue General Gordon at Khartum, but arrived two days after Gordon had been killed and Khartum had fallen. On his return to England he was created a viscount. In 1890 he was made commander of the troops in Ireland, and in 1895 he was raised to the supreme command of the British army.

WOLSEY, wool'zy, THOMAS, Cardinal (1475?-1530), an English statesman, for many years the most powerful man in England, below the king. He was born at Ipswich, the son of a butcher, and was educated at Magdalen College, Oxford, where he took his degree as a scholar of distinction. When Henry VIII became king, the advancement of Wolsey was rapid. Successively he was appointed canon of Windsor, dean of York, bishop of Lincoln, archbishop of York, lord chancellor of the kingdom, cardinal and Pope's legate.

His power and his revenues were equaled only by those of the Crown. Part of his immense revenues he expended in display, and part for the advancement of learning. He endowed the College of Christ's Church, Oxford, founded several lectures and built the palace at Hampton Court, which he presented to the king. His preferment by the king was largely the result of a remarkable series of diplomatic victories, in which Wolsey had been the means of enabling Henry to hold the balance between Francis I and Emperor Charles V.

In his ambitious career the cardinal had made many enemies, who were held in check so long as he retained the favor of his royal master. This favor Wolsey lost when he failed to obtain from Pope Clement a decision granting the king's divorce from Catharine of Aragon. The enemies of the fallen prelate now succeeded in banishing him from court and stripping him of his dignities.

Finally, after a brief respite, during which he was restored to some of his offices and had returned to his see of York, he was arrested on a charge of high treason. On his way to London, as a prisoner, he died at Leicester Abbey.

WOLVERINE, *wool vur een'*. See GLUT-TON.

WOMAN'S CHRISTIAN TEMPERANCE UNION, THE NATIONAL, a woman's organization, founded in Cleveland, Ohio, in 1874, for the purpose of unifying the work of women in temperance and social reform. It now has state, district, county and local societies in every state and territory, and it contains a membership of over 300,000. It is the largest organization exclusively of women that has ever been effected and has over forty distinct lines of work, each under the management of national, state, district, county and local superintendents. The society has been instrumental in securing in nearly every state the enactment of laws requiring the public schools to give instruction in the effects of stimulants and narcotics on the human system; through their influence many laws for the better protection of girls and women have also been passed, and industrial homes for girls and houses of refuge for fallen women have been established. The official organ is the *Union Signal*, published at Chicago. Headquarters of the society are at Evanston, Ill., in "Rest Cottage," the former home of Miss Frances E. Willard.

The World's Christian Temperance Union was formed in 1883, through the influence of Miss Willard. It now has local organizations in most Christian countries. The badge of members everywhere is the white ribbon.

WOMAN'S RELIEF CORPS, a patriotic organization founded in Denver, Colo., in 1883, by a group of women desirous of acting in coöperation with the G. A. R. The specific objects of the society may be stated as follows:

To aid and assist the G. A. R. and perpetuate the memory of their heroic dead; to find homes for the Union Veterans, their widows and orphans, and to emulate the deeds of our army nurses; to maintain true allegiance to the United States of America; to inculcate lessons of patriotism and love of country among our children and in the communities in which we live; to encourage the spread of universal liberty and equal rights to all.

The organization has thirty-six departments, comprising about 2,640 local corps, and has a total membership of over 160,800.

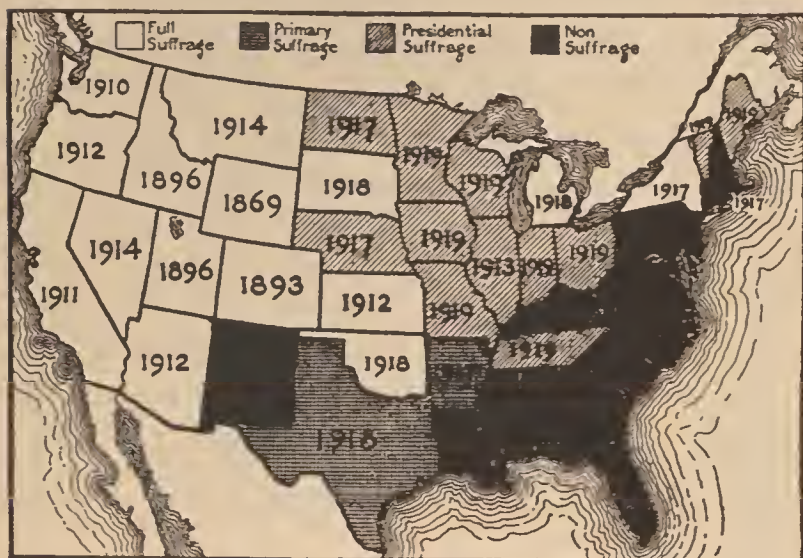
WOMAN SUFFRAGE, the right of women to vote on an equality with men. The agitation to give women a political status equal to that of men is merely one phase of the great movement to recognize woman in every possible way—legally, socially, intellectually, morally, politically—the equal of man. In the field of business this agitation for a fair and equal opportunity for women had made more progress than in any other field, up to 1919. In nearly all departments of skilled labor, in clerical positions, in the professions, women are efficient and successful workers.

The movement to secure woman suffrage is distinctly a product of the nineteenth century, although many authors and statesmen since Plato have discussed the position of woman and have urged equal rights. One of the first American suffragettes was Abigail Adams, the wife of John Adams; she wanted the Constitution to recognize women as voters.

In nearly all civilized countries women either have won or are still fighting for suffrage, and in most of the countries liberated from autocracy during or at the close of the World War the women were immediately given political rights when new governments were set up. Thus, women vote in Czechoslovakia, Finland, Germany, Austria, Hungary, Poland and Russia. In all the divisions of the United Kingdom women voted for Parliamentary candidates for the first time in December, 1918. New Zealand, Australia and South Africa are equal-suffrage nations, and in Canada women enjoy provincial suffrage in all the provinces except Quebec. Tasmania, Denmark, Holland, Iceland, Norway and Sweden have also enfranchised their women citizens.

In the United States. In the United States the movement for woman suffrage really dates from 1848, when the first woman suffrage convention was held, in Seneca Falls, N. Y. Among its leaders were Elizabeth Cady Stanton and Lucretia Mott. In 1869, through the efforts of Mrs. Stanton and Susan B. Anthony, the National Woman's Suffrage Association was formed. In 1890 this organization united with one founded the same year by Henry Ward Beecher, and the name National American

Woman's Suffrage Association was adopted. The organization in coöperation with numerous state societies worked tirelessly for the extension of women's political rights, and in



BEFORE THE AMENDMENT

The map shows the status of women suffrage on August 1, 1920. The white areas were full-suffrage states; slanting lines indicated Presidential suffrage; squares, primary suffrage; black, no suffrage. A Constitutional amendment to grant suffrage to all women of the United States passed the House of Representatives on May 21, 1919; the Senate, June 4. It was ratified in 1920.

1919 a woman suffrage amendment to the Constitution passed both Houses of Congress. It was sent to the states for ratification, and in August, 1920, this was accomplished. By referring to the map the reader may see the progress of the movement.

WOM'BAT, a burrowing mammal belonging to the same order as the kangaroo, having the characteristic pouch for carrying the young (see **MARSUPIALS**). Wombats are found only in Australia and Tasmania. They look somewhat like small bears, are two to three feet in length and have a coat of long, coarse fur, yellowish-black or grayish-brown in color. The head is broad and flat, the eyes and ears are small, and the tail is short. The creatures feed on leaves, roots and vegetables, coming out of their burrows at night in search of food. Their flesh tastes somewhat like pork; the fur is used in making rugs and mats.

WOMEN'S CLUBS. With the increase in facilities for the education of women and with their growing share in public life, came the feeling of the necessity for coöperation along lines in which they were interested. The first societies of women were religious, charitable and social organizations. As educational advantages were extended to women, study clubs sprang up among them, and from these have developed the highly efficient women's organizations of to-day.

At present there exist in the United States a great number of clubs for women. A great many of these clubs are *departmental*, that is, are divided into groups interested respectively in literature, household economics, municipal improvements, politics, and so on, each group coöperating with the others and the interests and activities often overlapping. Others are devoted exclusively to politics, art, travel, domestic science, or are made up of members of some profession.

Within recent years women's clubs have brought about many reforms in school administration and municipal management. They have turned their attention systematically to promoting child welfare, improving the condition of working women and awakening the public conscience generally to a realization of the need of reform. In many cities, owing to their influence, vacant property has been converted into playgrounds or into kitchen gardens for the poor. Prisons, asylums, charitable organizations, dance halls and innumerable other institutions have felt their influence.

In 1889 an invitation was issued by a prominent club in New York to different clubs throughout the United States to a general meeting. In the following year the General Federation of Women's Clubs was formed, the membership consisting originally of sixty-three clubs. At present the General Federation holds meetings every two years in some large city. The total membership is about 2,000,000.

WOOD, LEONARD (1860—), an American soldier and administrator who was the originator of military camps for college students and citizens' training camps, such as that at Plattsburg, N. Y. He was born at Winchester, N. H., and educated at Pierce Academy, Middleboro, and Harvard University, where he was graduated in medicine in 1884. He joined the medical staff of the army, and in 1886 was the medical line officer in Captain



LEONARD WOOD (afterwards Major-General) Lawton's campaign against the Apache Indians. In 1908 he received the Congressional Medal of Honor for distinguished services in that cam-

paign. He was appointed assistant surgeon of the army in 1888, and in twelve years rose to the rank of major-general of volunteers.

At the outbreak of the Spanish-American War, General Wood (then Colonel) and Theodore Roosevelt organized the First Cavalry, known as the "Rough Riders." Wood was first and Roosevelt second in command of the regiment which is famous for its gallant charge at San Juan Hill.

General Wood was appointed governor-general of Cuba in 1899 and continued in the position until the United States retired from the island in 1902. He displayed rare tact and administrative ability, especially in improving the sanitary conditions of Santiago and Havana. Yellow fever, a former scourge of the island, has been practically unknown in Cuba since General Wood's administration. In 1903 he was placed in charge of a division of the army in the Philippines and in the same year was made a major-general in the regular army. In 1908 he was made chief of the Department of the East, with headquarters at New York. In 1910 he was special ambassador to Argentina, and the same year was appointed chief of staff, retaining the position until 1914, when he returned to the command of the Department of the East.

While he was chief of staff, General Wood inaugurated military training camps for college students and the citizens' training camps, which later were important agencies in training officers for the army. He has always been a strong advocate of military preparedness. When the United States entered the World War, General Wood was transferred to the Department of the South, with headquarters at Charleston, S. C. In April, 1918, he was assigned to the command of the 89th Division at Camp Funston, Kansas. The Washington administration did not permit him to take a command in France. From Camp Funston he was transferred to the Central Department, with headquarters at Chicago, in 1919. In 1920 he sought the Republican Presidential nomination, and in 1921 was appointed governor-general of the Philippine Islands by President Harding.

WOOD AL'COHOL, or **METHYLATED ALCOHOL**, a liquid having the appearance and many of the properties of pure alcohol. It is obtained from the destructive distillation of wood, and is used as a solvent for resin and varnishes and as a fuel in the same

way as ordinary alcohol. It mixes with water in all proportions. A mixture of seventy-five per cent water and twenty-five per cent alcohol in an automobile radiator will prevent freezing at a temperature of five degrees above zero; a mixture of fifty per cent each will prevent freezing at twenty degrees below zero. Wood alcohol should never be used medicinally, either externally as a liniment or internally, as it is very poisonous, producing vertigo, coma, blindness and death.

WOOD'BINE. See **HONEYSUCKLE.**

WOOD CARVING, the art of producing sculpture in wood. Wood carving was probably the earliest form of sculpture. As far as known, the Egyptians were the first wood carvers. Specimens of their work, made more than 4000 B. C., are still in existence, and it is quite probable that the Greeks obtained their first ideas of sculpture from the wood carving of these people. The Romans also carved many of their early statues from wood. In the first century of the Christian era wood carving was used in the decoration of churches, and many pieces still in existence show the remarkable skill of the artists and workmen of that time. From the early centuries of the Christian Era wood carving fell into disuse, until about the eleventh century, when it was again revived, and used, as before, in the decoration of churches.

Wood carving as practiced to-day is confined to the ornamentation of altars, pulpits and choir stalls for churches; to a few articles of the most expensive furniture; to the decoration of expensive interiors of dwellings and public halls, and to ornaments. Among European nations the art is practiced with the greatest skill in Tyrol, Switzerland, and some of the provinces of Italy and Germany. Among the Eastern nations the Persians are remarkably skilful in carving wood. The work is finely executed, but shows a tendency to overcrowding, which mars the general effect. The Chinese and Japanese also produce wood carvings of decided merit.

All the finest work is done by hand, with small chisels, shaped for the purpose. Oak, mahogany, ebony and many of the softer woods are used. Before carving, the wood should be thoroughly seasoned. The completed work is usually finished by rubbing down in oil. In the United States but little hand carving is done, though in some manual training schools it is now a part of the course.

WOOD'CHUCK, the popular name of an animal of the squirrel family, common in the United States and Canada. The woodchuck is the American marmot and is often called the *ground hog*. It is of a heavy form, from fifteen to eighteen inches long, blackish or grizzled above and chestnut red below. It feeds on vegetables and is very destructive to crops of red clover and alfalfa. In the winter it hibernates in burrows. There is a popular superstition that the woodchuck first comes out on Candlemas Day (February 2); if it sees its shadow it returns to sleep, because it knows that six weeks of cold weather will follow.

WOOD'COCK, a bird belonging to the same family as the snipe, differing from the latter in having a more bulky body and shorter legs. It is widely distributed over North America, Europe, Northern Asia and Japan. It spends the summers in pine



WOODCOCK

forests and the winters in southern swamps and moist woodlands, where worms, snails and slugs are plentiful. It is active by night and quiet during the day. If discovered near its nest it feigns injury, or it may carry its young away to safety, one at a time, between its thighs. The bird is about twelve inches long. The upper plumage is an intermingling of ruddy, yellowish, and ash, and is marked with black spots. Underneath, it is yellowish red with zigzag markings. The eyes are large and are set far back. The bill, nearly half the length of the body, is used with great skill in digging worms.

WOOD ENGRAVING. See ENGRAVING, subhead *Wood Engraving*.

WOODEN HORSE. See MYTHOLOGY, *Story of the Wooden Horse*.

WOODMEN OF AMERICA, MODERN, a fraternal and insurance society founded in 1883 at Lyons, Iowa, and the following year chartered under the laws of Illinois. It is the largest fraternal benefit organization in America, having a membership of more than a million. The head officer is known as head

cousul, and the various geographical divisions, of which there are more than 14,000, are called camps. From its founding to April, 1, 1919, the order had paid out in death claims more than \$210,000,000. One of the beneficial features of the society is a large and well-equipped tuberculosis sanatorium at Woodman, Colo.

WOODMEN OF THE WORLD, a fraternal and insurance order founded in 1890 at Omaha, Nebr. The organization is divided geographically into three main camps, one of which is the Sovereign Camp of the World, whose executive committee is also the governing body of the entire order. The Woodman's Circle, an affiliated organization, of which Woodmen may become members, is controlled by a body called the Supreme Forest. Woodmen pay old-age benefits and erect monuments to deceased members. By levying a special assessment they were able to pay benefits in all cases of members killed in the World War. Since its founding the order has paid out in benefits more than \$100,000,000. In 1919 it had 13,186 subordinate camps and a membership of approximately 1,000,000.

WOOD'PECKER, the name of a large group of climbing birds, of which there are



YELLOW-BELLIED SAP SUCKER

a number of different species. They have long, straight, angular beaks, adapted to perforating the bark of trees. Their tongues are long, slender and armed with a barbed,

horny tip. They can thrust their tongues far out of their mouths and so spear insects in the depths of their burrows. Their tongues are also covered with a sticky, slimy substance, that helps to hold their prey. When feeding, they usually ascend the tree spirally, aided by the spiny points which terminate their tail feathers. They tap here and there on the tree-trunk, searching for the holes in which insects are hidden, and often tear away large parts of rotten trees, for the larvae concealed in them.

The *sap sucker* is a species that is fond of the sap of trees and bores round holes, which it arranges with geometrical exactness in broad bands around the trunk of a tree. It especially favors the pines, and in feeding it moves about over the checkerboard of holes, taking the sap from them regularly, as it accumulates. The *ivory-billed woodpecker* of the southern United States is a large bird, about twenty-one inches long, bright black and white in color, the male having a large bright scarlet crest. Like most of the other woodpeckers, this one excavates its nest in suitable dead trees. The *red-headed woodpecker*, the *black and white woodpecker*, the *hairy woodpecker* and the *downy woodpecker* are well known in the Northern states. The redheaded woodpecker often lights on the shingles of houses or on a hollow branch and strikes his bill in a noisy clatter, stopping now and then to call out his hoarse, rough note. The woodpeckers are found in almost every temperate part of the globe, except that none ever existed in Australia and Egypt. See FLICKER.

WOOD PE'WEE, a little bird of the fly-catcher family, related to the phoebe. It is brown on the back and yellowish-white underneath; the quills are brown, with light edges. The spread of the wings is about twelve inches. The bird has a rapid flight and catches insects with skill. Its low, plaintive little note, *pee-a-wee*, may be heard in the woods, all through the long summer, at early dawn and during the twilight hours. The birds spend the summer in the United States and Canada, and in winter they migrate to South America. The nest is a wonderful structure of mud, grass and moss lined with down and other soft materials, and hangs bracketlike against a beam or tree. Two broods are raised annually in spring and autumn. See PHOEBE.

WOOD SPIRIT. See METHYLATED SPIRIT.

WOODSTOCK, ONT., the county town of Oxford County, is situated about midway between Detroit and Niagara Falls, on the Canadian Pacific and the Canadian National Rys., and on a line of the Canadian National, which runs from Port Dover on Lake Erie to Owen Sound and other Georgian Bay ports. It is also connected with the Michigan Central and Wabash systems by a branch of the Canadian Pacific. The city is beautifully situated at the confluence of the Thames River and Cedar Creek. Its famous avenues of trees, general attractiveness and healthfulness make the city a favorite summer resort.

Woodstock is an important manufacturing and commercial center. The leading manufactures include furniture, pianos and organs, textiles, wagons and sleighs, harness, cereals, flour, agricultural implements, automobiles, stoves and furnaces and numerous other products. The city has excellent hotels, a collegiate institute and a Y. W. C. A. It is also the seat of Woodstock College. Population in 1911, 9,328; in 1921, 9,935.

WOOL AND WOOL'EN MANUFACTURE. Wool, the modified hair of sheep and several species of goats, is, with the exception of cotton, the fiber most extensively used in the manufacture of cloth and clothing. Woolens afford warmth without great weight, and are a protection against extreme heat as well as against cold. They are soft and flexible, and of them the most healthful clothing is made.

Structure and Grades. If we draw a fiber of wool through the fingers from tip to base it feels rough; if we draw it from base to tip, however, it is smooth and soft. An examination of wool through the microscope shows the cause of this difference. Wool fiber consists of minute scales or plates, which overlap like the scales on a fish. The difference in quality of the fiber is due to the difference of these scales in size and shape.

Wool is graded as coarse, medium and fine, according to the length and size of the fiber. The finest sheep's wool is obtained from the Merino sheep and varieties that have been developed from this breed. The wool from which alpaca and mohair are made is that of the Cashmere goat, from which the soft, silken Persian shawls and rugs are made. Some wool resembles fur in fineness.

For purposes of manufacture, wool is divided into *carding wool*, which includes that

of short, curly fibers, and *combing wool*, which includes the long fibers. The coarsest of the long fiber wools are known as *carpet* and *blanket wools*. The quality of wool varies in the same fleece, that on the shoulders and sides being the best and that on the back the poorest.

Production. Under normal conditions, the leading wool-producing regions of the world are Australia, Argentina, the United States, Great Britain, and South Africa. The unusually heavy demand for woolen garments and blankets for the great armies during the World War led to an over stimulated production in many countries, which make it difficult to state figures of normal production. Comparisons of production in certain sections for different years show the great extent of the industry, and the possibility of its extension, whenever increasing demand requires it.

In 1909 there were in the United States about 50,000,000 sheep; in 1919, about 35,000,000. In 1909 the wool produced was 290 million pounds; in 1919, 229 million. In other countries there are similar variations. Australia produced 648 million pounds in 1909, and 547 million in 1921; South Africa produced 189 million pounds in 1910, and 230 million in 1921; New Zealand dropped from 194 million to 174 million pounds in the same period:

The following table gives the eight leading states in 1919 with comparative figures for 1909 (in pounds, with 000 omitted)

| STATE | 1919 | 1909 |
|------------------|--------|--------|
| Wyoming | 18,411 | 42,827 |
| Montana | 18,267 | 37,669 |
| Idaho | 17,860 | 16,377 |
| Oregon | 16,039 | 18,841 |
| Ohio | 15,264 | 21,685 |
| California | 15,216 | 14,064 |
| Texas | 14,900 | 10,257 |
| Utah | 11,690 | 12,102 |

Manufacture. The following are the chief processes employed in making woolen cloth:

When the wool is brought to the factory, it is carefully sorted, and that having the same grade of fiber is placed together. It is then thoroughly cleaned by being dusted, scoured with soap or lye and hot water, and then rinsed. After this, if colored cloth is to be made, the wool is dyed. It is then dried and is ready for the second important step in the process, that of preparing it for the loom.

The dried wool is first run through a machine, which removes any burs that may have adhered to the fiber. It is then run through the *picker*, which pulls all of the little tufts of wool apart and also enables the manu-

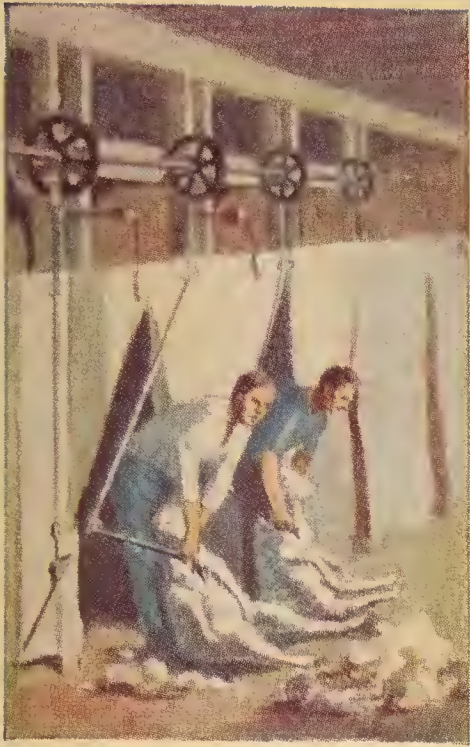
facturer to mix wools of different colors in any proportion desired. By mixing white and brown or blue and black or blue and gray, many very pleasing effects are obtained. After picking, the wool passes through the carding machines, of which there are usually three. Each of these draws out the fiber and straightens it and places the wool in the form of a loose band, or roll. Each successive machine straightens the fiber and reduces the size of this band, making it each time proportionately stronger. When the wool leaves the third card, it is in the form of a *sliver*, an untwisted yarn a little larger than the heavy crocheting yarn. As it comes from this machine it is wound upon large spools, or bobbins, and is ready for spinning.

The spinning is done on the mule jenny, and a large number of threads are spun at a time. The size of the thread and the hardness of the twist depend upon the way in which the machine is gauged. For a fine thread that is hard twisted, a machine which revolves very rapidly and also draws the thread out rapidly, is necessary. The spun yarn is wound upon spools ready for being placed in the loom. The arrangement for this consists of frames upon which these spools are placed in such a position that the thread unwinds from them directly, to make the warp of a width and number of threads desired. The woven cloth is finished in the style desired, possibly re-dyed, pressed and wound into bundles containing about fifty yards each, in which form it is placed upon the market.

| | |
|---|----------|
| Related Articles. Consult the following titles for additional information: | |
| Alpaca | Sheep |
| Cashmere Goat | Shoddy |
| Dyeing | Spinning |
| Felt | Teasel |
| Fiber | Tweeds |
| Flannel | Weaving |
| Mohair | Worsted |

WOOL'FLOWER, CHINESE, an ornamental plant, which has been introduced into America from China since 1910. It is very showy when in bloom, each stem being capped with a dense, ball-like cluster of deep red, woolly blossoms. The plant is hardy and bushy and attains heights under three feet. It blossoms in July.

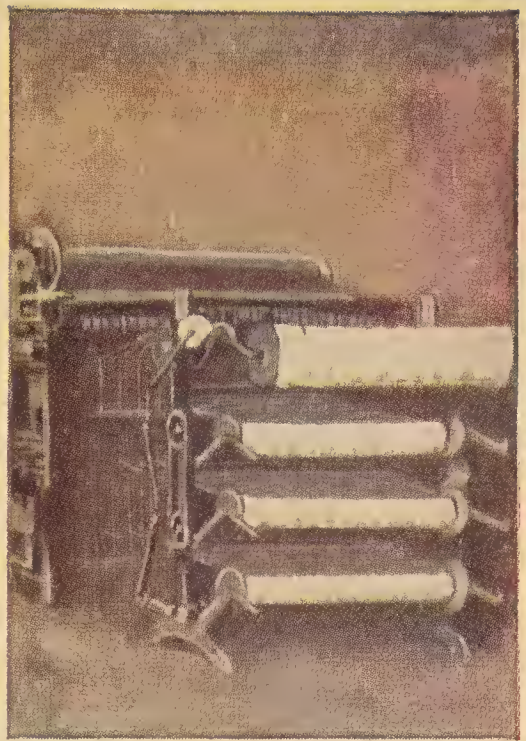
WOON'SOCKET, R. I., in Providence County, fifteen miles northwest of Providence, on the Blackstone River and on the New York, New Haven & Hartford Railroad. It is an important center for the manufac-



1



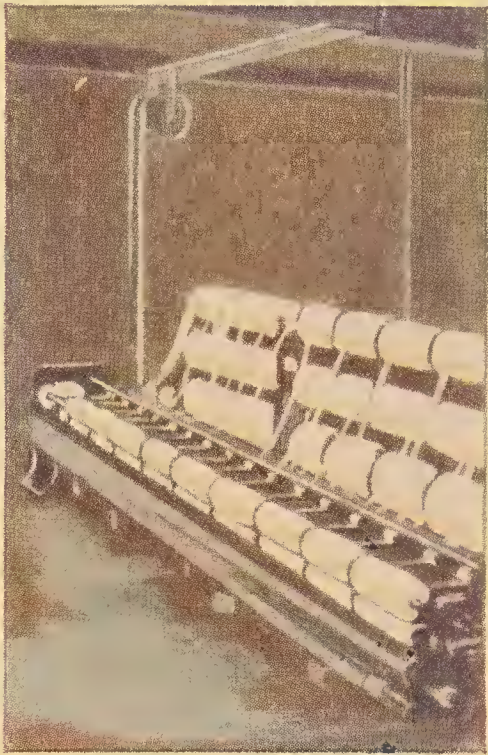
2



3



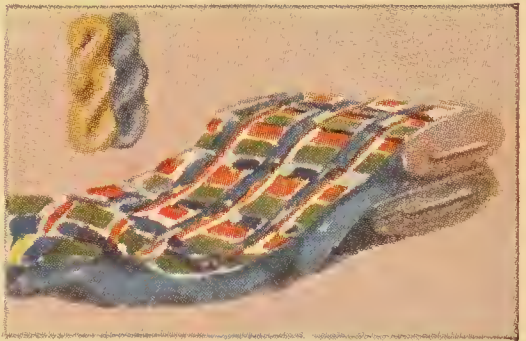
4



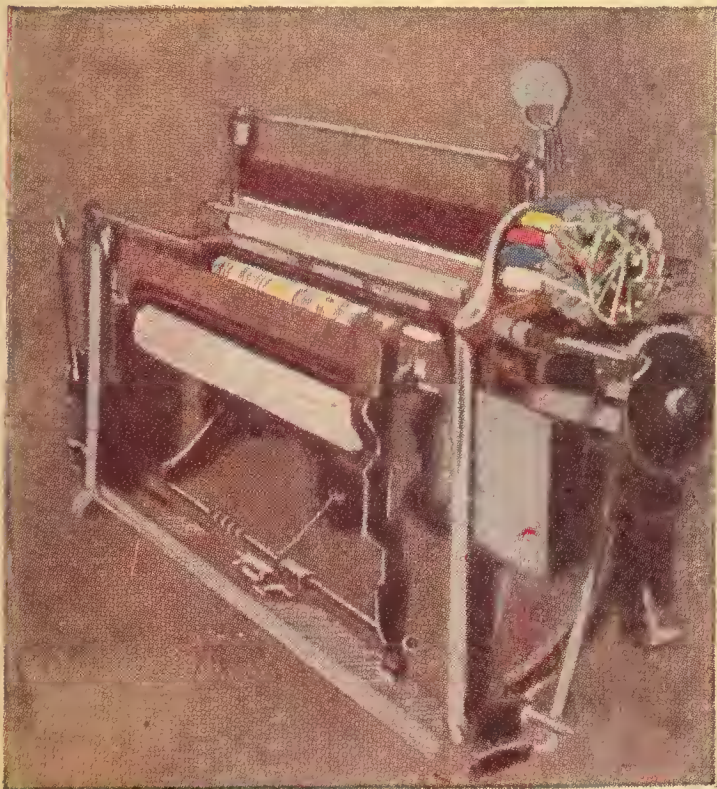
5



6



9



7



8

WOOL

1, Shearing of sheep.
2, Sorting and grading.
3, Carding.

4, Combing.
5, Drawing.
6, Spinning.

7, Weaving.
8, Woolen factory.
9, Products.

ture of cotton and worsted goods, and also manufactures foundry and machine shop products, wringers, knit goods, hosiery, rubber boots and shoes. The Sacred Heart College for men, an academy for girls and the Harris Institute Library are located here. A magnificent bridge crosses the river. The present city was incorporated in 1888. It was formed by the consolidation of several factory villages, but the original village of Woonsocket, settled in 1666, was not included. Population, 1910, 38,125; in 1920, 43,496, a gain of 14 per cent.

WORCESTER, *woos'ter*, MASS., the second city in size in the state, one of the county seats of Worcester County, forty-four miles southwest of Boston, on the Blackstone River, and on the New York Central, the Boston & Maine, the New York, New Haven & Hartford and the Worcester & Providence railroads. It is one of the most important manufacturing centers in New England and has the largest wire factory in the world. Other important industries include the manufacture of machine tools, corsets, underwear, leather belting, automobile accessories, cars, vacuum cleaners and carpets.

The city is noted for its large number of excellent buildings, chief among which are a city hall, a courthouse, a public library, with four branch Carnegie libraries, a Federal building, the Bancroft Hotel, the art museum, the state armory, a state asylum for the insane and the buildings of the women's club, the American Antiquarian Society, the Worcester Society of Antiquity and the Young Men's and Young Women's Christian associations. The educational institutions include Clark University, Clark College, College of the Holy Cross (Roman Catholic), the Worcester Polytechnic Institute, Assumption College (Roman Catholic), the Worcester Academy (for boys), and a state normal school.

There are a number of pleasant summer resorts in the vicinity, including Lake Quinsigamond and Mount Wachusett, which are connected with Worcester by electric railway.

Worcester was first settled in 1673, but was abandoned on the outbreak of King Philip's War, two years later. A second attempt in 1684 was also given up because of Indian depredations, and the first permanent settlement was not made until 1713. In 1722 Worcester was incorporated as a town, and in 1848 was chartered as a city. Wor-

cester is the birthplace of the historian George Bancroft. It was at one time one of the most important publishing centers in the United States. Population, 1910, 145,986; in 1920, 179,741.

WORDEN, JOHN LORIMER (1818-1897), an American naval officer, born in Westchester County, N. Y. He entered the navy in 1835 and became a lieutenant eleven years later. In March, 1862, he was in command of the *Monitor* during the famous battle with the *Merrimac*, in Hampton Roads. In this engagement his eyesight was seriously impaired by the explosion of a shell. He was able to take subsequent commands, however, and served with gallantry until the close of the war. In 1870 he became head of the Annapolis Naval Academy and was made rear-admiral in 1872. He retired in 1886.

WORDSWORTH, *wurdz'wurth*, WILLIAM (1770-1850), an English poet, a leader in the Romantic movement which transformed English poetry early in the nineteenth century. He was born at Cockermouth, Cumberland. While at a grammar school at Hawkshead, he spent much time in solitary rambles, and the love of nature manifest at this time grew throughout his life and was his most prominent characteristic. He was graduated from Cambridge in 1791, and later in the same year he went to France. At first he felt the most ardent sympathy with the Revolution, but the excesses which developed out of it shocked him greatly, and as time went on he settled down to a staid conservatism. Many of his contemporaries, ardent republicans like Byron and Shelley, condemned him severely for the change. Shortly after his return from France, Wordsworth published his first poems, *An Evening Walk* and *Descriptive Sketches taken during a Pedestrian Tour among the Alps*, which, although they were written somewhat after the manner of Pope, yet contained signs of the new poet's peculiar genius.



WILLIAM
WORDSWORTH

In 1795, Wordsworth, with his sister Dorothy, settled at Racedown in Dorset, where they were visited by Coleridge, who

induced them to remove to Alfoxden, in the immediate neighborhood of his own residence at Nether Stowey. Here the two poets held daily intercourse, and after a twelve-month they published *Lyrical Ballads*, in literary copartnership. This volume contained as Coleridge's contribution *The Ancient Mariner*, and as Wordsworth's, among others, *We are Seven* and *Lines on Tintern Abbey*. Although the poems were received with almost complete public indifference, yet Wordsworth felt that he had found his mission, and after a winter spent in Germany, he and his sister settled at Grasmere, one of the most beautiful places in England, where he gave himself up to literary work. Thenceforth his life was marked by few incidents. Those worth noting are his marriage, in 1802, with Mary Hutchison; his appointment, in 1813, to an inspectorship of stamps, and his removal to Rydal Mount; several journeys into Scotland and to the continent; his acceptance of a D. C. L. degree, conferred upon him in 1839 by the university of Oxford, and his accession, in 1843, to the laureateship, on the death of Southey.

The public and the critics were slow to recognize Wordsworth's ability, refusing utterly to accept his idea that poetry may deal with simple and natural subjects, presented in simple and natural language. Coleridge, Lamb, De Quincey, Southey, Keats and others were always his admirers, however, and his faith in his own mission was too strong to be shaken. His great philosophic poem, which, in his own phrase, was to be the Gothic cathedral of his labor, received only a fragmentary accomplishment in *The Prelude*, *The Excursion* and *The Recluse*. Yet enough was achieved in his smaller poems to justify his own conception of himself as a "dedicated spirit," and to set him apart among the greatest of England's poets. His intense sympathy with nature and his firm belief in the brotherhood of man find expression in all of his poems; and his language, although always simple, sometimes rises far above what he insisted it should be, the unadorned language of prose. Among the most beautiful of Wordsworth's poems are the *Ode on the Intimations of Immortality*, *Ode to Duty*, *the Solitary Reaper*, *To a Highland Girl*, *I Wandered Lonely as a Cloud* and *Yarrow Revisited*. His sonnets are among the finest ever produced by any English poet in any age.

WORK, a general term for effort expended toward a given end, but it also implies motion against a resisting force, that certain results may be obtained. A man who lifts a weight, in labor or in play, performs work; the resisting force he encounters is the force of gravitation. The impulse which sends the electric current along a copper wire to light a room or run a motor performs work. The water which in falling wears away solid rock performs work just as surely as does that which falls over a water-wheel and turns the machinery of a mill. Work is accomplished whenever one body transfers its energy to another body.

WORK'HOUSE, a name applied in England to institutions for the maintenance of paupers. In the United States those establishments where vagrants, drunkards and other such offenders are detained are sometimes called workhouses, but more properly they are called houses of correction. In these institutions the inmates are put to work according to their capacity and ability. Religious and secular instruction is supplied, and habits of industry, cleanliness and order are encouraged. In England, while the parliamentary act of 1722 to promote the workhouse movement remained in force pauperism was almost unknown there.

WORKMEN'S COMPENSATION LAWS. See EMPLOYER'S LIABILITY.

WORLD'S COLUMBIAN EXPOSITION, an international exposition of arts and industries, in commemoration of the four hundredth anniversary of the discovery of America by Columbus. It was built in Jackson Park, Chicago, on the shore of Lake Michigan, and was open from May 1 till November 1, 1893. The construction of the exposition occupied two years, besides the time consumed in preparatory work, such as study, investigation and advertising. The exposition was formally opened May 1, 1893, Grover Cleveland, then president of the United States, setting the intricate machinery in motion by pressing a button connected with electrical appliances. His opening address was listened to by an assemblage estimated at fully 400,000 people. The exhibition comprised over 400 buildings, covering fully 200 acres of ground. Fifteen of these buildings were occupied by special classes of exhibits, of individuals, firms, states and nations, every important nation on the globe being represented in some one or more de-

partments. The largest building was the Manufactures and Liberal Arts Building, 787 by 1,687 feet in size, covering nearly forty acres, including the surrounding colonnade, and costing \$1,500,000. Its enormous roof was supported by the largest steel arches ever used in building construction. Besides the buildings used for the exposition proper, nearly every state in the Union and many foreign nations erected buildings for social and exhibition purposes.

The architectural beauty of the whole exposition was one of its greatest triumphs, and, indeed, it has rarely, if ever, been excelled. The center of the main group of buildings was the Court of Honor, consisting of a wide plaza, with a lagoon in its center, having at one end a beautiful electric fountain, sculptured by McMonnies, and terminated at the other by a graceful semi-circular peristyle.

The whole cost of the exposition to its managers before the opening was more than \$18,000,000, the cost of operation exceeded \$7,000,000, while the expenditures by states and foreign nations were not less than \$8,000,000. Adding to this enormous sum the expenses incurred by private exhibitors, the total cost of the exposition was probably \$40,000,000. The attendance from the opening to the closing day was 27,539,041, or slightly less than the attendance at the Paris Exposition of 1889. The largest attendance upon any one day was on Chicago Day, October 9, when 716,881 people passed through its gates. One of the most novel and interesting features of the exposition was the Midway Plaisance, a boulevard 600 feet wide, connecting Jackson and Washington Parks. Along the sides of this avenue was arranged a motley collection of amusement enterprises, the most interesting consisting of representative scenes from the life of various peoples of Europe, Africa and the Orient.

An interesting and important feature of this fair was the World's Congress Auxiliary consisting of special congresses on all the main topics of human interest, social, physical, industrial, educational, philosophical, commercial and religious. The congresses of religion presented features of peculiar interest, being attended by representatives of the Hindu, Buddhist, Shintoo, Mohammedan, Zoroastrian and various other religions of Asia and Africa, as well as by the most illustrious divines of Europe and America.



WORLD WAR (1914-1919), the greatest war in human history, and the only one that drew into its vortex nations of every continent. It is sometimes called the GREAT WAR and the WAR OF THE NATIONS, but no name has been found or can be suggested which can fittingly describe its magnitude.

In respect to number of men engaged and casualties, amount of money lavished, human effort expended, number of nations involved and changes in political and social structure resulting from it, the World War has no parallel among the conflicts which men have been fighting from the dawn of history. While it loosed all the hatred and brutality inherent in human nature, bringing out primitive passions and racial antipathies in all their rawness, this war also served as a background for nobility and courage almost divine, and it illuminated with startling clearness some of those fundamental conceptions of freedom and justice upon which the future security of humanity rests.

Causes of the War. These causes were rooted deep in past conditions of society, government, and economic and political relations. No one would say that any particular event was in itself responsible for the World War. It was, indeed, like the breaking out of a sore on the surface of a world that for centuries had been harboring the germs of hideous diseases. It does not follow, however, that all nations engaged in the conflict were equally blameworthy. No discussion of the causes of the war can ignore the ambitious plans of the German imperialists, to whom the declaration of war was an opportunity to carry out certain well-defined aims for German domination of the world.

The General Situation in 1914. A general European war had been foreseen and prophesied by many observers long before the actual crisis. Prophecies of this nature were based on certain conditions in Europe which held dangerous possibilities and may

be regarded as underlying causes of the war. Outstanding elements in the situation were racial antagonisms and the development of nationalism. In 1871 Germany forced on France a peace which violated the principle of national unity when Alsace-Lorraine was forcibly annexed to the empire. The French, a proud, high-spirited people, never forgave or forgot this humiliation, and the two neighboring nations were friends only on the surface.

In Austria-Hungary the racial problem was acute. That monarchy was a loose union of many diverse peoples, possessing no bond of loyalty or of common interest. Among these were the Bohemians, or Czechs, mindful of their lost independence, and determined to maintain their national consciousness; and the Southern Slavs, in Bosnia, Croatia and other sections, with visions of the establishment of an independent Slavic state. The Pan-Slavic agitation was becoming more and more a source of anxiety to the Austrian government, and the situation was complicated by the known sympathy of Russia, the greatest of the Slav nations, for the aspirations of the Slavic people both in Austria-Hungary and in the Balkans.

The Balkan states themselves presented a baffling problem. Here the mixture of races was so complicated that an accurate geographic arrangement of peoples, in conformance with the principle of national unity, was a hopeless task. The Balkan wars of 1912-1913 had nearly forced Turkey out of Europe and had left Serbia, Montenegro, Rumania and Greece with increased territory and augmented national consciousness. Rumanians, Serbians and Greeks all had their dreams of bringing under their respective flags neighboring territories peopled by their own kinsmen. Bulgaria, on the other hand, smarting from its recent defeat, was nursing a sense of injustice and hoping for a day of revenge.

Added to this conflict of aims and hopes was the antagonism between Slav and Teuton. The defeat of Turkey in 1912-1913 was a blow to both Germany and Austria-Hungary, for it increased the prestige of the Slavs, and made more real the menace to the integrity of Austria-Hungary. Germany was no less interested in preserving the Hapsburg monarchy than was the Austro-Hungarian government itself, for a disrupted monarchy meant a check to Germany's plan to dominate

the Balkans and to secure a gateway to the East. It meant also the collapse of Emperor William's *Mittel Europa* (Middle Europe) scheme.

In discussions of the background of the war much has been said of Pan-Germanism, which was the spirit of national consciousness carried to the extreme limit. The Pan-Germans, who included not only militarists, but historians, scientists, educators and statesmen, conceived the German people, no matter where they were located, as permanently retaining their nationality. The most ambitious of this group believed that it was the mission of Germans to extend their *kultur* (culture) over the world, and to accomplish this by conquest, if necessary. In this connection the theory was advanced that the German was a superior being, destined to dominate other peoples, most of whom were thought of as decadent. While many German authorities denied that the Pan-German doctrine represented official Germany, or a majority of the people, the extensive propaganda of its adherents certainly affected the German nation, and the speeches and acts of the emperor clearly pointed to his sympathy with the theory.

Military preparedness was a necessary corollary of these national ambitions and racial jealousies. Standing armies, huge appropriations for armaments, highly-developed munition factories and the other accessories of war turned Europe into an armed camp; with symbols of war on every hand pacifism waged a losing fight with militarism. Germany's preparations for a possible war were more complete than those of any other nation, partly because of the splendid industrial organization of the empire, and partly because of the spirit of the German people themselves. Bismarck, who had launched the empire on its career by a policy of "blood and iron," was the great national hero, and the necessity of militarism was believed in by the people as a whole. They accepted burdensome taxes as essential to the welfare of the Fatherland.

In 1913 a new army bill in Germany caused a frenzied increase in war preparations in Europe generally, which did not add to the possibilities of peace. Another factor in the situation was the building up of a great German navy by Emperor William, a procedure that England viewed with concern. As a result, the two nations engaged in a

race in naval armaments, with England in the lead, and Germany following with the second largest navy in the world.

Germany's growth in naval strength was a contributing cause to the formation of the Triple Entente by England, Russia and France, one of those military alliances that were another development of national rivalries. In 1882 Italy had joined with Germany and Austria in the Triple Alliance, for common defense. France and Russia, fearing this strong combination, formed a Dual Alliance in 1895, and in 1907 they were joined by England, which was disturbed by Germany's naval policy. It may readily be seen how delicately-balanced was a peace condition with the great powers thus ranged against each other. In fact, between 1905 and 1914 there were several crises, each of which almost brought on war.

Economic rivalry also had a part in setting nation against nation. The colonial expansion of the other nations, notably Great Britain, and the advantages resulting therefrom spurred Germany on to securing its place as a great colonial power, and this brought about the inevitable clash of interests in the colonized and undeveloped parts of the world. In England, Germany's naval program was looked upon chiefly as a plan to overthrow British commercial supremacy. In such manner was the stage set for the great drama of 1914-1919.

Outbreak of the War. On June 18, 1914, the heir apparent to the Austrian throne, Archduke Francis Ferdinand, and his wife were assassinated while on a visit to Sarajevo, the capital of Bosnia. The assassin, a young Bosnian named Gavrilo Princip, was one of the principals in a scheme to incorporate Bosnia in a Greater Serbia. Bosnia, including Herzegovina, was peopled by Serbs who had never become reconciled to the annexation of the province by Austria-Hungary in 1908. Francis Ferdinand was selected as a victim because he was friendly to the idea of placing the Slavs of the Hapsburg monarchy on an equal footing with Germans and Magyars (Hungarians), and the Serbian plotters believed that such a plan would imperil their own scheme.

The affair took on an international aspect because the Austrian government believed that the crime was plotted in Belgrade, the capital of Serbia, by the Serbian government itself. The erection of such a state as Greater

Serbia would disrupt the monarchy by paving the way to other Slavic secessions. Accordingly, the Austrian government decided to crush the Serbian movement once for all, and to do so by dealing directly with Belgrade.

On July 23 a stern ultimatum was sent to the Serbian government, ten demands being submitted, and forty-eight hours being given for a reply. These demands required that Serbia should dissolve all societies engaged in Pan-Serbian propaganda, dismiss all teachers or government officials hostile to Austria, suppress publications advancing the movement, take measures to stop the smuggling of arms across the border, permit Austro-Hungarian agents to assist in the suppression of the movement, and Austro-Hungarian representatives to take part in the investigation and punishment of persons accused of complicity in the crime. Serbia's reply to these demands was conciliatory, but Austria seems to have made them purposely unacceptable. The demands that Austrian agents be permitted to help suppress the anti-Austrian movement and that Austrian representatives assist in the judicial proceedings against the plotters were protested against as infringing on the sovereignty of Serbia. Moreover, the smaller state expressed its willingness to submit the disputed questions to The Hague Tribunal or to the decision of the great powers. Austria professed to find the answer unsatisfactory, and on July 28 issued a declaration of war.

The Flame Spreads. The great powers were keenly interested in the outcome of the Austro-Serbian controversy. Germany, having a vital interest in the integrity of the Hapsburg monarchy, supported Austria's attitude and was suspected in a meeting at Potsdam in July, presided over by Emperor William, of having urged its ally to precipitate a crisis. Russia was as vitally interested in preserving the balance of power in the Balkans and of saving Serbia from a state of vassalage. Here again came to the surface the old animosity between Teuton and Slav, with the German alliance eager to extend German and Austrian influence in the Balkans, and Russia determined to play the rôle of "big brother" to the small Slavic states. France, as an ally of Russia, naturally sided against the Teutonic states, but Italy, the third member of the Triple Alliance, held aloof from its allies because they were not entering a war of defense.

The diplomatic wires grew hot during the tense week following July 23. On the 28th Russia openly announced its intention of mobilizing its army against Austria if troops crossed the Serbian border, and on the 29th partial mobilization was ordered. On the same day Sir Edward Grey, the British Foreign Secretary, who had previously made unsuccessful efforts to arrange a conference of the powers to settle the dispute, urged the German government to suggest a method of preventing war between Russia and Austria. No satisfactory basis of agreement could be reached, however, and on the 31st Germany sent an ultimatum to Russia, demanding that Russia cease mobilizing within twelve hours. As the Russian government declared that it was impossible to stop the process, Germany on August 1 declared a state of war against Russia and at the same time requested a statement from France as to its intentions in the event of a war between Germany and Russia. The reply being unsatisfactory, Germany declared a state of war against France on August 3.

Germany, in the meantime, had been hoping that Great Britain, though in agreement with Russia and France, would remain neutral, and had informed the British government that the territorial unity of France would be preserved if Great Britain kept out. It was further stated that no guarantee would be made regarding French colonies. Great Britain refused to promise its neutrality, and to the last moment labored for a compromise. On August 2, however, France was notified by England that its northern coast would be protected from attack by the German fleet. This partial intervention was followed on August 4 by a declaration of war against Germany by Great Britain because of the violation of Belgium's neutrality.

In 1839 the great powers, including Prussia, had entered into a treaty guaranteeing the independence and neutrality of Belgium, and in 1870, when France and Germany were at war, a separate treaty was signed between Great Britain and each of the belligerents, by which Great Britain agreed that if either nation should violate Belgian neutrality the other could rely on England as an ally.

On July 31, 1914, the governments of Germany and France were requested by Great Britain to state their attitude on the question of Belgian neutrality. France replied that in

case of war such neutrality would be respected. Germany's reply was evasive, and on August 2 the German Foreign Minister presented to the Belgian Minister an ultimatum demanding that the German forces be permitted to pass through the country (the easiest way to France). In case of refusal Germany warned Belgium it would be treated as an enemy. To its undying honor Belgium declined thus to lend itself to the subjugation of France, and refused the demand, at the same time appealing to Great Britain, France and Russia to carry out the terms of the treaty of 1839.

On August 4 Great Britain sent an ultimatum to Germany demanding a favorable reply to its request that Belgium be unviolated, giving the German government until midnight to reply. As no reply was received, England entered the war on midnight, August 4, and thus on August 5, Germany and Austria found themselves surrounded by enemies. Italy, their ally, had declared on August 1 that it would remain neutral. Montenegro elected to go to the defense of Serbia within a few days, and Japan, Britain's ally in the Far East, entered the struggle on August 23. Turkey within a few weeks became an ally of the Teutonic powers.

The list of war declarations for 1914 is as follows:

| | | |
|-------------------------------------|------|----|
| Austria-Hungary, on Serbia | July | 28 |
| Germany, on Russia | Aug. | 1 |
| Germany, on France | Aug. | 3 |
| Germany, on Belgium..... | Aug. | 4 |
| Great Britain, on Germany..... | Aug. | 4 |
| France, on Germany | Aug. | 4 |
| Austria-Hungary, on Russia | Aug. | 6 |
| Montenegro, on Austria-Hungary.... | Aug. | 7 |
| Montenegro, on Germany..... | Aug. | 9 |
| Serbia, on Germany..... | Aug. | 9 |
| France, on Austria-Hungary..... | Aug. | 10 |
| Great Britain, on Austria-Hungary.. | Aug. | 12 |
| Japan, on Germany..... | Aug. | 23 |
| Austria-Hungary, on Japan..... | Aug. | 27 |
| Austria-Hungary, on Belgium..... | Aug. | 28 |
| Russia, on Turkey..... | Nov. | 3 |
| France, on Turkey | Nov. | 5 |
| Great Britain, on Turkey | Nov. | 5 |

German Drives in the West. Germany was superbly prepared for war, and its mighty military machine lost no time in getting into action. The military operations at once resolved themselves into two great campaigns, for Germany had to meet enemies on its widely separated eastern and western frontiers. Immediately after the war broke out the German strategy became clear. A quick, de-

cisive dash into France was to be followed by the shifting of most of the victorious troops from the west to meet the Russian millions on the east. This plan failed only by the narrowest of margins, partly because the Belgian resistance delayed the advance and gave the French time to organize, and partly because the Russians mobilized more rapidly than



A YEAR OF WAR IN THE WEST

had been expected. When the campaign in France was at a crisis, therefore, the Germans were compelled to weaken their offensive by sending thousands of soldiers to defend their eastern frontier against strong forces of the czar.

In Belgium. The western campaign developed with great rapidity. The Germans appeared before Liège on August 5, and took the city on the 8th. Before the end of August they had taken practically all of Belgium except Antwerp and a narrow strip on the coast. The Belgian army was driven into Antwerp, but early in October was driven out again after a ten-days' bombardment. A part of the Belgian army succeeded in making its escape along the coast and joined the French forces south of Ostend, but about 20,000 took refuge in Holland and laid down their arms. The success of the Germans in pounding their way into Antwerp and other strongly fortified towns was chiefly due to the superiority of their artillery, particularly the 42-centimeter Krupp siege guns.

On the Marne and the Aisne. During the last week in August and the first week in September there took place one of the most remarkable military movements in all history. The German army, of probably 1,000,000 men, advanced in a wide sweep across France almost to the gates of Paris before its advance was checked. In two weeks the main German army advanced over 150 miles. Opposing them was a large force of French soldiers under General Joffre, and a constantly increasing number of British soldiers under General Sir John French. After the fall of Antwerp the extreme left of the allied line was held by Belgian troops led by King Albert in person. While the Germans were occupied in Belgium, the main French armies had made unsuccessful attacks on Alsace and Lorraine, chiefly for sentimental reasons. It was the German plan, therefore, to reach Paris before the French line in the north could be adequately strengthened. This plan, however, miscarried. On September 2 the seat of the French government was moved to Bordeaux, and Paris prepared for a siege. The German right under Von Kluck, however, swept to the east of Paris, thus exposing its flank to the attack of the strong Paris garrison. For five days, September 6th to 10th, the Germans held their positions along the Marne River. Here was fought the greatest battle of the war up to that time and one of the greatest battles of all history. The Marne marked the high tide of German invasion.

By the 12th of September the whole German army was in retreat along the lines over which it had advanced. The retreat, however, was masterly, and in spite of the superior and increasing number of the allied forces, they were unable to turn the defeat into a rout. On the hills along the River Aisne the German retreat came to a halt. Here they retired to strong fortified positions previously prepared for them, positions so strong that the allies could not drive them out by direct attack. The allied right, too, found it impossible to turn the German left, and there remained only the possibility of turning the extreme German right. This attempt was first made about September 15, but was repulsed after the allies had penetrated as far as Saint Quentin. The next flanking movement came in the neighborhood of Cambrai, and the third near Arras; these failed in turn. The German line was now vastly extended from its original position, and as the allies

moved northward the Germans kept pace. At the end of September the German attack on Antwerp began, and the flanking movement of the allies became in fact an attempt to save this fortress and the Belgian army. But the allies were too late.

After the capture of Antwerp (October 10), the Germans, by taking Ostend, placed their right flank on the sea coast. Two days later the allied forces reached Dunkirk, thus ending the possibility of flanking movements by either side. The battle-front now extended from the English Channel to Switzerland.

The Battle of Flanders. In October the German army attempted to advance along the coast to Calais, presumably with the object of establishing a base for an invasion of England. For five weeks the battle raged along the canals and the River Yser. No other conflicts during the war were so bloody. In the region of Nieuport, Dixmude and Ypres, the battle raged incessantly, but to no purpose. In spite of enormous masses hurled forward by the Germans, the allied lines held firmly. At the end of five weeks the battle-line was practically unchanged.

Deadlock in the West. From October, 1914, to August, 1915, the battle-front, as shown in the accompanying map, was little changed. There were occasional brilliant successes, but only of local importance. In the neighborhood of Soissons the Germans made a considerable gain, and at the northern end the allies made several gains which straightened the line. In Alsace the French advanced about 10 miles, but they were unable to drive the Germans out of Saint Mihiel. On the whole, the entire line, over 400 miles long, settled down to a condition of siege unprecedented in history. After October the center of interest was transferred to the eastern frontier.

The Eastern Campaign. In the east Poland became the great battlefield, for the chief objective of the Russians was the conquest of Galicia, or Austrian Poland, while the Germans sought the conquest of Russian Poland. During the first month of war the Russians mobilized with unexpected rapidity, advanced in force through East Prussia, and for a few days threatened serious consequences. On September 1 the terrible rout at Tannenberg ended the danger from this source, and made Von Hindenburg one of the great figures of the war. Gradually the Russians were forced back to the Niemen, where

they took a new hold and later carried their line back to the German frontier. Here a deadlock arose like that in the west.

Meanwhile, in Galicia, Russia was winning tremendous success. Tarnopol and Lemberg fell, Przemysl was besieged, and by October 1 the Austrians were driven back to within 50 miles of Cracow. At this point the Germans launched a strong offensive movement against the Russian center, which was driven back over 100 miles to the permanent defenses of Ivangorod and Novo Georgievsk. This retreat of the center compelled the Russian left to retreat in Galicia, but the relief to the Austrians was only temporary. The German advance was only seven miles from Warsaw when the Russians, by a threatened flanking movement, compelled a retreat to the German border. Once again, in December, January



A YEAR OF WAR IN THE EAST

and February, the Germans slowly advanced on Warsaw, but were unable to take it. In East Prussia the Russians advanced in force in February, but after the ten-days' battle

of the Mazurian Lakes they were compelled to retire. In Galicia the Russians made themselves masters, finally took Przemyśl on March 22, 1915, seized all the passes of the Carpathian Mountains, and were ready to advance in force across the plains of Hungary.

New German Offensive. Just as an invasion of Hungary seemed certain a combined German and Austrian army led by Von Mackensen routed the Russians and drove them out of Galicia, forcing them back to the position they held at the beginning of the war. By the first of August the Germans were again at the gates of Warsaw and on the 4th the city was taken. By this campaign the central powers regained the lost territory and rendered a new Russian offensive impossible for several months.

Turkey in the War. On October 29, 1914, two German warships that had been sold to Turkey, but were still operated by German officers and crews, bombarded Odessa and other ports on the Black Sea. Turkey's explanation of this act was unsatisfactory and on November 3 Russia declared war on the Ottoman Empire. Great Britain and France took like action on November 5. The Turks made unsuccessful attempts to invade Egypt and Russian Caucasia. On February 15, 1915, a fleet of the allies attempted to force an entrance into the Dardanelles and take Constantinople. A large army was landed on Gallipoli Peninsula to assist the fleet. The enterprise failed, and the troops were withdrawn at the end of six months, though it was later known that the Turks were out of ammunition and were ready to capitulate when the allies withdrew. The German emperor looked upon Turkey's entrance into the war as a blow to the integrity of the British Empire and the French colonial empire, as he expected the Mohammedans in these empires to start a Holy War. In this he was completely disappointed.

The War in Asia. Japan, as has been intimated, entered the war as the protector of allied interests in the Far East. On August 19, 1914, an ultimatum was sent to the German Foreign Office requesting Germany to surrender the leased territory of Kiaochow, China, which the German government had acquired in 1897. Upon refusal of Germany to comply, Japan declared war on August 23, and shortly afterwards began a siege of the port of Tsingtau. On November 10 all of the leasehold was surrendered.

With German power in East Asia thus overwhelmed, the British could give their attention to an offensive against the Turks in Mesopotamia, in order to destroy the German threat to Egypt and the Suez Canal, and to pave the way for an advance into Asia Minor, the heart of the Turkish Empire. Early in the war it was apparent to the entente allies that a blow should be struck at German pretensions in Asia Minor. The *Mittel Europa* scheme of Germany had for its object the control by the Germans of a path southeast through Europe by which Berlin could control the entrance into Asia through Turkey. In Asia Minor the Germans had concessions which justified the hope of ultimate control of a strip of territory to the Persian Gulf. Their railroad already extended to historic Bagdad. If a direct route from Berlin through to the seas south of Asia were established, Great Britain could one day be attacked in India and North Africa, in pursuance of the German dream of world domination.

In November, 1914, the British routed the Turkish garrison at Basra, sixty miles north of the Persian Gulf, and then advanced to Kurna, at the confluence of the Tigris and Euphrates rivers. Moving steadily northward through the spring and summer of 1915, the victorious troops defeated the enemy before Kut-el Amara, on the Tigris, on September 28, and by November had reached a point eighteen miles from Bagdad. Here the British army, which was commanded by Major-General Townshend, was defeated by a greatly superior force and driven back to Kut-el-Amara. In Persia and Turkish Armenia the Russians won several victories over the Turks in 1915, and it was hoped that at the end of the year they might be able to raise the siege of Kut-el-Amara.

German Colonies. Most of Germany's colonial empire was lost early in the war. On August 29, 1914, German Samoa surrendered to an expeditionary force from New Zealand, and on September 11 Australian troops captured the capital of the Bismarck and Solomon islands; German New Guinea was occupied two weeks later. The Japanese, by the end of October, had taken possession of the Marshall, Marianne and Caroline islands. In Africa, Anglo-French forces captured Togoland in August, 1914, and during 1915 occupied German Southwest Africa. In December of that year it was announced that

a force had been raised in South Africa to carry out the conquest of German East Africa. This was speedily accomplished.

Campaign in the Balkans. Serbia, with the aid of a small army of hardy Montenegrins, was able to offer a stiff resistance to invading Austrians, who were driven out of Belgrade in December, 1914, with heavy losses. Austrian defeat was due in part to the Russian invasion of Galicia, which forced Austria to withdraw large numbers of its troops to that theater of war. The good fortune of the Serbs was short-lived, however. The campaign left the country impoverished and exhausted, and ill prepared to cope with a new enemy on its eastern border.

In October, 1915, after months of deliberation, the Bulgars decided to throw in their lot with the Teutonic powers, as Germany and Austria were able to promise them a better territorial settlement than the entente was disposed to offer. In October a Bulgarian army joined the Austro-German forces under Field Marshal von Mackensen, and early in December Serbia was crushed. King Peter and his officials fled, and the Serbian government was set up in Corfu. Albania and Montenegro were brought under control of the Central powers early in 1916, and were held by them until November, 1918.

Situation in Greece. The king and queen of Greece, the latter a sister of the kaiser, maintained a pro-German attitude in the war, while the majority in Parliament, under the leadership of Premier Venizelos, wished to join the entente. Greece was bound by treaty to go to the assistance of Serbia in case the latter were attacked, but King Constantine interpreted this treaty to refer to a Balkan, not a general European, conflict. Accordingly, Greece remained neutral for the time being. In December, 1915, however, after being defeated by the Bulgars on the Vardar River, the allies occupied the city of Saloniki, and made it impregnable, as they interpreted the position of Greece as one of "benevolent neutrality." Venizelos and the allied sympathizers approved of this attitude; the king and his followers protested against the "violation of Greek neutrality."

War Declarations of 1915. The entrance of Italy into the war, as an ally of the entente powers, in May, 1915, was the greatest diplomatic triumph of the year for Great Britain, France and Russia. The war declarations of the year are as follows:

| | | |
|------------------------------------|------|----|
| Italy, on Austria-Hungary..... | May | 23 |
| San Marino, on Austria-Hungary.... | June | 2 |
| Bulgaria, on Serbia | Oct. | 13 |
| Great Britain, on Bulgaria..... | Oct. | 15 |
| France, on Bulgaria | Oct. | 16 |
| Russia, on Bulgaria..... | Oct. | 19 |
| Italy, on Bulgaria..... | Oct. | 19 |

Italy in the War. Italy had helped save France early in the war by announcing its neutrality. Spared the necessity of guarding the Franco-Italian frontier, the French had been able to concentrate enough forces on the Marne to check the Germans in September, 1914. Germany and Austria, however, spared no pains to conciliate Italy, and entered into lengthy negotiations with Rome to keep the Italians from joining the allies. In this they were unsuccessful, and Italy declared war on Austria on May 23, 1915. There were three forces back of this decision: traditional hostility toward Austria; a popular "irredentist" movement, aiming at the liberation of those Austrian districts inhabited by Italians; a sentiment against Austro-German imperialism and militarism, which was threatening civilization and democracy. The Italians were able to put a finely-trained army into the field at once, which began an invasion of Austria and gained some initial successes. Trent and Triest were the objective points. By the end of 1915 Italian troops had made a good beginning, but were still far from their goal.

Events of 1916. The entente gained two new allies in 1916, Portugal and Rumania. During the year there were major offensives by the Russians, Anglo-French forces and Italians, a successful defense at Verdun, a great battle between the German and English fleets off Jutland, and an extension of German submarine warfare. Other events are noted below.

The New Belligerents. War declarations of 1916 were as follows:

| | | |
|-----------------------------------|------|----|
| Germany, on Portugal..... | Mar. | 8 |
| Austria-Hungary, on Portugal..... | Mar. | 15 |
| Italy, on Germany..... | Aug. | 27 |
| Rumania, on Austria..... | Aug. | 27 |
| Germany, on Rumania..... | Aug. | 28 |

Portugal, whose treaty with Great Britain bound it to furnish its ally with 10,000 troops when they were needed, was not asked to take any decisive action until February, 1916, when Sir Edward Grey requested the Portuguese government to take over all German and Austrian merchant vessels interned in Portuguese waters. On Portugal's compliance with

this request the two central powers declared war against Portugal in March. Forty merchant ships were acquired by the entente through this move. Later Portuguese troops engaged in severe fighting on the western front. Rumania declared war on Austria in August, 1916, in the hope of liberating from Austrian rule the provinces of Bukowina and Transylvania, inhabited by large numbers of Rumanians.

The Struggle for Verdun. One of the most desperate campaigns of the war began on February 21, 1916, when a German army under the command of Crown Prince Frederick William began an attack on the fortifications of Verdun, a strongly-fortified city commanding the heights of the Meuse. The Germans hoped by a spectacular victory at this point to discourage the French, quiet political discontent at home, and relieve the French threat at the rich iron mines north-east of Verdun and in German Lorraine. If the French hold on the Meuse heights could be loosened, their army would never be able to conquer Alsace-Lorraine, and the morale of the soldiers would suffer a severe blow. The great drive carried the German troops through the outlying defenses of the fortress, but after months of desperate fighting the French, commanded by General Pétain, were still holding the heart of the salient, and all resolute, indomitable France was ringing with the battle cry of the soldiers, "They shall not pass!"

From February to July the Germans gained 130 square miles of territory, including two battered forts and about forty ruined villages. Then for several weeks there was a lull in the fighting, while the French were making preparations for a counterstroke. It came in October, when General Nivelle, who had superseded Pétain, began an offensive on the east bank of the Meuse, north of the town. In the first onrush Douaumont village and fort, Thiaumont farm and redoubt and Haudromont quarries were recaptured. Other successes followed, and in December a renewal of the offensive brought about the recapture of several other strategic points. Though it took another year of fighting to bring the French lines near to their original position, the failure of the German stroke and the success of the French counter-attack made the battle an allied victory at the end of 1916. Losses on both sides were heavy, with the Germans suffering the more severely.

Battles of the Somme. A military conference of the allies was held in Paris in March, 1916, at which a plan for concerted action was perfected. Hitherto disconnected attacks on the various fronts had given the central powers the advantage because the excellent railway system of Germany enabled large bodies of troops to be moved quickly from one front to another as they were needed. A large British army under the command of Sir Douglas Haig was mobilized in France along the Somme, while the German Crown Prince was carrying on his campaign against Verdun.

In the last days of June the British, French and Belgians began a systematic bombardment of the German defenses that extended from Verdun all the way to the North Sea. This bombardment was especially violent along the section north and south of the Somme, where the British were opposite the German lines. The heavy artillery of the British and French demolished the works of the enemy in this section, and on July 1 the forward movement began. The allies captured all the German first line trenches over a front of twenty-five miles. Within fifteen days fifteen villages and about 25,000 prisoners were taken.

After the first impetus of the drive had spent itself there was a period of quiet with both sides preparing for the next phase of the battle. On September 3 the Anglo-French forces struck again, the British at this time making use of a new war device, the armored tank. When the battle died down, in November, the allies had recaptured about 120 square miles of territory. The Germans are estimated to have lost 700,000 in killed, wounded and prisoners; the allies, 675,000. General Haig asserted the battle was an allied victory because it had relieved the pressure on Verdun, kept the Germans from withdrawing forces to the east against Russia (see below) and served to diminish the German manpower.

The Second Russian Offensive. Russia devoted its energy during the first months of 1916 to increasing and training its armies, and supplying them with arms and ammunition. There were several engagements on the southern part of the line held by the Russians before June, and on the third of that month the Russian forces under General Brussiloff began an extensive forward movement which swept the country from the

Pripet River on the north to Rumania on the south. The crownland of Bukowina was occupied, Lemberg, in Galicia, was threatened, and the advance column of the invaders reached the Carpathian Mountains. Several important towns fell into the hands of the Russians, and they took a large number of prisoners. The drive had spent itself by August, but it helped the French, British and Italians by keeping the Central Powers busy on both the east and the west fronts. Russia lost hundreds and thousands of its best troops in the fighting of 1914-1916, and was being menaced from within by corrupt officials and traitors. The sequel to this was the betrayal of Rumania, which entered the war on August 27 (see below).

Italian Reverses and Victories. In May the Austrians began an offensive against Italy for the purpose of disrupting allied plans for a summer campaign, and in the hope of putting the Italians out of the war by a conquest of Northern Italy. After a month of strenuous fighting the Austrians recovered 270 square miles of their own territory and conquered 230 square miles of Italian soil. The Italians lost heavily in men and material, but they offered strong resistance and definitely checked the offensive, besides inflicting heavy losses on the enemy. Russia's attack on Galicia and Bukowina, which forced Austria to withdraw troops from the Italian front, was a great factor in saving Italy from further invasion.

Two weeks after Russia launched the Austrian campaign, General Cadorna, commander of the Italians, began a vigorous counter-offensive with a new army of 500,000 men. During the last week of June the Austrians began to retreat on the Trentino front, where the Italian offensive proceeded vigorously throughout July. On August 4, five weeks after the Anglo-French attack on the Somme, Cadorna opened a vigorous attack along the Isonzo front, with the city of Goritz as the objective point. This place was protected by hills and mountains bristling with guns, but the Italians carried everything before them in their impetuous onslaught, and on August 9 triumphantly entered the city with King Victor Emmanuel at their head. The tide of battle then turned southward to the Carso plateau, which lay a strong barrier between the Italian army and the coveted city of Trieste. Here progress was made only at the expenditure of well-nigh superhuman efforts.

The Tragedy of Rumania. The Rumanians began an invasion of Transylvania (in Hungary) immediately after the declaration of war against Austria-Hungary. During September they conquered about one-fourth of Transylvania and captured nearly 7,000 prisoners. The Rumanian staff confidently expected that General Sarrail, the allied commander in Macedonia, would keep the Bulgarians from attacking, and that Russia would take care of the Austro-German forces on the Russian front. Rumania itself was left unprotected, a rash proceeding that brought about a speedy collapse of the new ally.

On September 2 a Bulgarian force invaded the Rumanian Dobrudja. Subsequently, the Germans under General von Falkenhayn trapped the Rumanian forces in the mountains of Transylvania, and invaded Rumania itself, and Field Marshal von Mackensen on December 6, after a series of brilliant victories, entered the city of Bucharest. The net results of the fighting from November 15 to December 6 were the rout of the Roumanian army, the capture of 80,000 prisoners and the conquest of the greater part of Wallachia (Southern Rumania). Lines of communication with Constantinople were opened, and large stores of supplies fell into the hands of the Central Powers, giving them additional means for carrying on the conflict.

It was subsequently revealed that chief blame for Rumania's plight must be placed on several of Russia's government officials, notably Premier Stürmer, a reactionary and a Pro-German. He had been instrumental in persuading Rumania to come into the war at a time when Germany could best cope with the situation, and had kept back promised Russian troops from Rumania when Bulgaria took the offensive and when Von Mackensen attacked. Through his intrigues needed supplies had been withheld when the Rumanians were sending desperate pleas for help, and before any operations began Rumania's plans were in the hands of the German officials. For these and other crimes Stürmer was indicted at the time of the Russian revolution; he was placed in prison, where he died, in September, 1917.

The War in Asia. In January, 1916, a Russian army under Grand Duke Nicholas invaded Turkish Armenia, drove back the Turkish forces in disorder, and on February 16 entered the fortified city of Erzerum, capturing over 320 guns and a great store of

supplies. In the spring Trebizond was captured, and in July the city of Erzingan, an important strategic center, 110 miles west of Erzerum, was taken. Elsewhere in Western Asia, however, the struggle did not go so well with the allies. General Townshend's British forces, besieged in Kut-el-Amara (see above), were starved into submission and surrendered on April 28, 1916. The force was diminished by fighting and hardship to fewer than 9,000 men, and the expedition was regarded by the English as a grave mistake. Russian expeditions against the Bagdad Railway also failed.

Allied Victories in Africa. At the beginning of 1916 only two colonies remained to Germany, Kamerun and German East Africa. Kamerun was completely overrun by Belgian,



AFRICAN COLONIES LOST BY GERMANY

British and French troops in January, and in February a powerful Boer army from South Africa, under the command of Jan Christian Smuts, invaded German East Africa. This army, in coöperation with British and Belgian troops, had conquered the greater part of the colony by the close of the year.

The War on the Sea. Early in the war German commerce was driven from the seas, British naval supremacy having saved the situation for the allies. The main German fleets did not attempt to dispute this supremacy, but remained at their bases at Kiel and Wilhelmshaven, protected by great fields of submarine mines and the strong fortifications of Helgoland. Several German cruisers,

however, did great damage to allied shipping before they were destroyed. Among these were the *Emden* and the *Königsberg*. The former cruised the Indian and the South Pacific oceans for three months, but were finally destroyed near Java by an Australian cruiser, on November 9, 1914. The *Königsberg* also had a successful career before its destruction on the coast of German East Africa.

The German Far East Squadron of five powerful cruisers, after defeating a smaller British fleet in November, off the coast of Chile, was itself defeated on December 8 off the Falkland Islands. Another important engagement occurred on August 28, in the bight of Helgoland, when a British fleet, accompanied by torpedo-boat destroyers, was led into action by Sir David Beatty. Three German armored cruisers and two destroyers were sunk. German raiders at various times bombarded English coast towns, and were somewhat successful in eluding the vigilance of British warships. On the other hand, Germany's hope of weakening England by striking terror into the hearts of the civilian population of these towns was quite unsuccessful.

The allies lost a good many ships through mines as the war continued, and a few German cruisers were still menacing allied shipping when a new form of naval warfare, the submarine, began to threaten the allies. In February, 1915, Germany announced that its submarines would destroy any merchant vessels venturing into the waters surrounding Great Britain and Ireland. Great Britain retaliated by declaring a virtual blockade of all Germany, and from that time on the submarine and the blockade engaged in a desperate fight to the finish. The importance of Germany's decision to use the underseas boat against merchant vessels was not at that time fully realized. It was destined to have far-reaching effects; in fact, it brought about Germany's downfall.

On May 31, 1916, occurred the only battle of the war in which the main fleets of Germany and England participated. It was fought in an arm of the North Sea—the Skaggerak—about fifty miles off Jutland. The British fleet was in command of Sir John Jellicoe but the division which bore the brunt of the battle was commanded by Vice-Admiral Beatty. The German fleet consisted of five battle cruisers, seventeen dreadnoughts,

eight predreadnoughts and several fast light cruisers and destroyer flotillas. In the British fleet there were six battle cruisers, four fast battleships, several fast light cruisers and destroyers, and twenty-five dreadnoughts. The Germans claimed that their high-seas fleet was cruising about in the hope that it might meet and give battle to the British fleet. The latter was on one of its periodical cruises in the North Sea.

In the afternoon, Vice-Admiral Beatty, who was in advance of the main force of the grand fleet, became aware of the presence of the Germans, and after maneuvering for position, opened fire simultaneously with the enemy. The battle lasted well into the night, without decisive results at the time. Losses on both sides were heavy, with the British suffering the more severely in number of ships destroyed. They admitted the loss of fourteen vessels and 5,613 men; the Germans, eleven ships and 3,966 men. However, the German ships retired to their base and the main fleet did not venture out again during the war. It was afterwards disclosed by a German naval authority that misty weather and skilful seamanship alone saved the German fleet from overwhelming defeat, and that the battle convinced the German command that it was impossible to wrest from the British their control of the sea through battles of this nature. From that standpoint the British won a victory, though they suffered heavier losses than their enemy.

Effects of Submarine Warfare. Once the German submarine warfare was launched, complications with neutral nations developed. In May, 1915, the Cunard liner *Lusitania* was torpedoed without warning off the coast of Ireland, while on its voyage from New York to Liverpool. About 1,150 persons lost their lives, including 114 Americans. The Germans considered this a justifiable act of reprisal because of the blockade, which was keeping food and other necessities out of Germany, but it was generally regarded as a violation of international law and of the laws of humanity, and aroused feelings of horror throughout the civilized world.

Of the neutral nations, the United States was the most powerful and the one whose good will was most needed by the belligerents. The sinking of the *Lusitania* brought to a climax certain diplomatic correspondence which had been passing between the United States and Germany since the an-

nouncement of the submarine campaign, and was the occasion of a series of notes from President Wilson in which he insisted on Germany's respecting the rights of neutrals on the seas. Other sinkings followed, however, and though the President apparently secured from Germany a promise to abstain from torpedoing merchant vessels without warning, unrestricted submarine warfare was announced as a deliberate policy early in 1917 (see below). The heavy losses inflicted on allied shipping by the submarines put naval experts on their mettle, and a vigorous anti-submarine campaign caused the destruction or capture of large numbers of undersea boats.

Events of 1917. The allies suffered a tremendous blow in 1917 in the collapse of Russia, but this was offset by a great diplomatic triumph, the entrance of the United States into the war. America's action profoundly impressed the Central and South American nations, many of which declared war on Germany or broke off diplomatic relations. Siam and China, in Asia, and Liberia, in Africa, also associated themselves with the allies, as did Greece, in Europe. The ever-widening circle of German opponents showed the extent of the feeling against submarine warfare and the ruthlessness of German warfare on land. Heartrending stories of the treatment of conquered peoples and reports of Turkish massacres of Armenians and Syrians added fuel to the flames of resentment that seemed to sweep around the world. Notwithstanding the powerful coalition against the Central Powers, their armies held their own in the fateful year of 1917, and they nearly put Italy out of the war. War declarations of the year were as follows:

| | |
|---------------------------------------|---------|
| United States, on Germany..... | Apr. 6 |
| Cuba, on Germany..... | Apr. 8 |
| Panama, on Germany | Apr. 9 |
| Greece, on Germany | July 22 |
| Siam, on Germany | July 22 |
| Liberia, on Germany | Aug. 7 |
| China, on Germany | Aug. 14 |
| Brazil, on Germany..... | Oct. 26 |
| United States, on Austria-Hungary.... | Dec. 7 |
| Panama, on Austria-Hungary..... | Dec. 10 |

The following nations severed diplomatic relations with Germany:

| | |
|------------|---------------|
| Bolivia | Honduras |
| Costa Rica | Nicaragua |
| Ecuador | Peru |
| Guatemala | Santo Domingo |
| Haiti | Uruguay |

Military Events in the West. *British and French Drives.* In January, 1917, after a period of intensive preparation, the British renewed the battle on the Somme front, gradually pushed the German line back, and by March 13 had come within artillery range of Bapaume, one of the main objectives of the Somme campaign. About this time indications pointed toward an extensive withdrawal of the German forces to a strong defensive position which came to be known as the "Hindenburg line." By March 15 the retreat was well under way, and General Haig thereupon ordered a general advance along the entire front from Arras to Roye. At the same time the French began an advance from Roye to Rheims. Stiff fighting ensued for several days, the Germans counter-attacking at intervals, but steadily moving back before the violent onslaughts of British and French. Something like 1,000 square miles of desolated territory were redeemed by the German withdrawal.

On April 9 a new offensive on a gigantic scale was begun, with the British striking for Lens, the center of the coal district, and for Saint Quentin. Among the spectacular feats of this drive was the capture of Vimy Ridge by the interpid Canadians. This ridge was the key position to Lens, which was thus placed in a dangerous "pocket." The British pushed their way to within a few hundred yards of Saint Quentin, but failed to take the city. By June the battle had become a deadlock, but the British had achieved one of their chief aims, the wearing down of German man-power and material. In counter-attacks during the Battle of Arras the Germans suffered very heavy losses.

Interest in the progress of the war was shifted to Belgium in June, where the British line at Ypres needed attention. It was in the form of a huge *S* written backwards, Ypres occupying the upper curve. In the lower curve was Messines Ridge, which was held by the Germans. If the Ypres salient were wrested from the allies the way to Calais would be opened to the Germans, and the precarious condition of the British line was a source of great anxiety. For over fifteen months preparations to capture the ridge were under way. Under the heights a series of mines ten miles in extent was placed, and these were exploded on June 7 by electric contact. The blast blew off the top of the hills and destroyed scores of

trenches and dugouts, while the artillery played on the exposed positions with unparalleled violence. English, Irish, Australian and New Zealand infantrymen then swept forward, capturing the entire ridge and assaulting the German positions in the rear. When this phase of the battle ended the British had captured defenses on a front five miles wide and three deep, straightened their line, taken 7,000 prisoners and removed the threat to Calais.

Meanwhile, on April 16, the French, under General Pétain, began an assault on the Aisne River, between Soissons and Rheims. Fighting continued at intervals until November, when the French held positions dominating the Aisne and Ailette valleys, including the celebrated Chemin des Dames (Road of the Ladies), capture of which was one of the great French exploits of the war. Forty square miles of territory were liberated, and 12,000 prisoners taken, besides immense quantities of war material.

Fighting in Belgian Flanders was renewed by the British in July and continued to the end of the year. They hoped to drive the Germans from the Belgian coast, to force them to abandon their submarine bases at Ostend and Zeebrugge, and to encircle the important industrial city of Lille. The ultimate objects of the campaign were not realized, but the new positions gained held out promise of better success for the 1918 campaign. Late in November the French battleground came again into prominence when General Byng made a spectacular attack in the direction of Cambrai, and at heavy cost approached within two miles of that German-held city. However, by a quick counter-stroke Hindenburg's armies pushed their foe back two miles, and the effect of Byng's dash was nullified.

The Collapse of Russia. In spite of disorganization and political upheaval in Russian official circles, a Russian army began an offensive in Baltic Russia, in January, with the capture of Mitau, capital of Courland, the chief objective. The movement was a failure, and in March the long threatening revolution broke out in Petrograd. The czar was forced to abdicate, and a democratic provisional government was set up.

The revolutionists declared their loyalty to the allied cause, but were unable to hold their armies together as a fighting machine. German propaganda further weakened the

morale of Russia's troops, and it was soon evident that whatever turn the revolution took the country was practically out of the war and could not longer be counted on for support, even to the extent of continuing to menace Germany and keeping German regiments on the eastern front. Under Kerensky as Premier an attempt was made to establish a republic on a moderate Socialistic basis, but the radical elements rapidly organized, and in November, headed by Lenine and Trotzky, they overturned the Kerensky régime. These radicals were known as the *Bolsheviki*, meaning *those of the majority* (for further details see RUSSIA and the article BOLSHEVIKI).

The Bolsheviki promised the people bread and peace, and immediately set about negotiating a treaty with the Central Powers which should put Russia out of the war. The peace envoys met at Brest-Litovsk, German eastern headquarters, once an important city in Western Russia, but since 1915 in ruins.

Perhaps never before had the world witnessed so one-sided a peace conference between nations which did not meet as victor and vanquished. Germany, through a legislative majority, had proclaimed its desire for peace without annexations or indemnities. At the conference, however, the German military leaders declared that Russia could not include German-occupied territory in peace discussions. This was a vital point in the negotiations, for during the summer and fall, while Russia was in political and industrial chaos, German armies had taken Riga and the provinces of Esthonia, Livonia and Courland, and had gained triumphs in the south where the Ukraine had declared for self-government.

Trotzky, in charge of the Russian peace delegation, unable to change the German purpose, withdrew his fellow members from Brest-Litovsk, declaring he would make no peace, yet would not continue the war. Subsequently, Lenine signed a humiliating peace, which deprived Russia of all occupied territory (for details, see RUSSIA). Even after the agreement was signed German armies continued to push farther into Russia, and Petrograd was threatened. The Bolshevik government thereupon moved to Moscow.

Rumania Crushed. At the close of 1916 Southern Rumania (Wallachia) was in the possession of the Central Powers, but the northern district, Moldavia, was not yet

subdued. In December the Teutonic forces began an offensive to complete their conquest of the country, and by the middle of February, 1917, they had under control all but a few sections in the north. The withdrawal of Russia from the war, later in the year, forced Rumania to make a reluctant peace. In March, 1918, the humiliating Treaty of Bucharest was signed, by which Rumania was forced to cede the Dobrudja as far as the Danube River to the Central Powers, and to grant economic advantages, such as the control of railways, wheat harvests and oil wells, for an indefinite period. The treaty made the country practically a vassal state of Germany.

Italy's Disaster. The account of the Italian campaign on a preceding page stated that the armies of Victor Emmanuel captured Goritz in August, 1916. In the spring and summer of 1917 they continued their attacks, winning brilliant victories and approaching to within ten miles of Triest. Then in the fall of 1917, when the allies were feeling the effects of the Russian collapse, they were disheartened by news of disaster from the Italian front.

After a campaign of subtle propaganda, during which Germany led several Italian divisions to believe peace to be near, Austro-Hungarian troops with the aid of strong German forces opened in offensive (October 21). Not only did Italy lose the ground that had been won the year before, but its enemy penetrated Italy itself and was not stopped until the Piave River was reached. About 1,000 square miles of Italian territory were thus laid under German domination. Venice was threatened; its works of art were removed, its wonderful buildings protected as much as possible, and the inhabitants sent farther south. Had not the lowlands around the mouth of the Piave been flooded to arrest the progress of the enemy, the city might have been attacked successfully.

Allied Victories in Asia. Though allied prospects were dimmed by the Russian, Rumanian and Italian disasters, the year 1917 was favorable for them in Asia. Early in the year the British began a campaign in Mesopotamia to offset the unsuccessful expedition of General Townshend. Under General Sir Stanley Maude British troops worked their way up the Tigris, forced the Turks to abandon Kut-el-Amara (February) and in March triumphantly entered the city

of Bagdad. The evacuation of the historic city was a blow to Turkish prestige, and with its fall the valuable cultivated fields of Babylonia came into British control. By fall the British had advanced a hundred miles north of Bagdad and had secured control of the Bagdad-Samara railway. In November they suffered a disaster in the death of General Maude.

Palestine was also the scene of allied victories. Early in February, 1917, the British under General Sir Edmund Allenby captured Rafa, on the Sinai Peninsula, and began an advance on Gaza and Beersheba. Not until autumn were these towns captured, but after the fall of Gaza, in November, progress was rapid. On December 10 Jerusalem was captured, and the Holy City was in Christian hands for the first time in four centuries.

Greece. Grecian neutrality was abandoned in June, 1917, when the king abdicated, and the pro-ally statesman Venizelos formed a new Ministry. King Constantine was succeeded by his second son, Alexander, as the crown prince was suspected of pro-German tendencies. In this diplomatic upheaval the entente had an active part. The allied army in Macedonia was now in a position to advance, as there was no longer danger of an attack in the rear on the part of Constantine.

The United States Enters the War. Throughout the year of 1916 President Wilson had been seeking by diplomatic correspondence to persuade Germany to modify its submarine warfare, which the President held was in direct violation of international law. What he sought in particular was Germany's promise that merchant and passenger vessels should not be attacked without warning. The Germanic allies were the only belligerents causing the death of noncombatants on the high seas, and feeling in the United States was stirred to a high pitch when sinkings continued in spite of apparent yielding to the President's demand. Then, early in 1917, came a crisis.

On January 31 Count von Bernstorff, the German ambassador at Washington, delivered a note to the State Department announcing the inauguration of unrestricted submarine warfare on the first day of February. The note stated that from that date all neutral and enemy vessels encountered anywhere on the seas would be sunk without warning, but

that the United States would be permitted weekly to send one ship in each direction across the Atlantic, if it were properly marked for identification and followed a designated course. Germany thus renounced a former promise to America to respect the rights of nations upon the high seas.

President Wilson thereupon severed diplomatic relations with Germany, and on February 3 Bernstorff was handed his passports. The two nations were not officially at war until April 6, but in the meantime the United States became an armed belligerent. On February 26 President Wilson asked Congress for authority to arm American merchant vessels. The House passed a bill granting such authority, but a filibuster in the Senate by a small group of opposition Senators prevented its passage before the expiration of the session of Congress, on March 4. The President, however, found authority for arming ships in an old act of 1819, and so nullified the efforts of the opposition.

On March 12 the policy of armed neutrality was announced. Meanwhile the country had been stirred to increased indignation by the publication of a note from the German Foreign Minister to the German ambassador in Mexico, directing the latter to propose an alliance with Mexico against the United States should America and Germany become enemies. A similar suggestion to Japan was proposed.

The policy of arming merchant vessels did not meet the situation, and sinkings continued. A large section of the population and press felt that actual participation in the war was the only honorable course, a feeling shared by the President, who called the Sixty-fifth Congress in special session on April 2. Before a joint assembly of both houses he read an eloquent war message in which he asked that Congress recognize a state of war between the United States and Germany. On April 4 the war resolution passed the Senate by a vote of 86 to 6, and on April 6 it passed the House by a vote of 373 to 50. The resolution was worded as follows:

Whereas, the Imperial German Government has committed repeated acts of war against the Government and the people of the United States of America: Therefore be it:

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled:

That the state of war between the United States and the Imperial German Government which has thus been thrust upon the United States is hereby formally declared; and that the President be, and he is thereby, authorized and directed to employ the naval and military forces of the United States and the resources of the Government to carry on war against the Imperial German Government; and to bring the conflict to a successful termination all of the resources of the country are hereby pledged by the Congress of the United States.

Chronological Survey of Events. The following is a list of events showing the relation of the United States to the war from its outbreak in 1914 to the war resolution of 1917. It shows that there were numerous hostile acts on the part of Germany and its agents from an early date:

1914

- Aug. 3—Congress appropriates \$250,000 for emergency relief of Americans in Europe.
- Aug. 4—America issues proclamation of neutrality.
- Aug. 5—President Wilson offers to mediate between belligerent nations; appeals for peace.
- Aug. 5—German-American cable cut.
- Aug. 14—German kaiser tells United States Ambassador Gerard that he is unable to accept president's offer of mediation; says neutrality of Belgium had to be violated on strategical grounds.
- Aug. 15—Congress appropriates \$2,500,000 for use of American diplomatic and consular officers abroad to relieve American citizens.
- Aug. 16—United States cruisers Tennessee and North Carolina arrive at Falmouth, England, with money for relief of stranded Americans.
- Aug. 18—President Wilson appeals to citizens of United States to observe strict neutrality towards all belligerents.
- Aug. 26—Belgium protests to the United States against throwing of bombs from German aircraft on Antwerp.
- Sept. 11—Congress appropriates \$1,000,000 for expenses of American embassies and legations abroad representing various belligerents.
- Sept. 16—Mission from Belgium appeals to President Wilson against alleged atrocities committed by Germans.
- Oct. 22—American emergency war tax—increase in internal revenue tax—becomes a law.
- Nov. 1—Rockefeller Foundation announces that it will help Belgium relief work.
- Nov. 16—United States launch from cruiser Tennessee fired upon by Turks at Smyrna.
- Nov. 25—Allies ask United States to help enforce neutrality of Ecuador and Colombia against German intrigue.
- Dec. 24—Admiral von Tirpitz, chief of German navy, outlines possibilities of ruthless submarine war and asks: "What will America say?"

1915

- Jan. 14—Buchthorne plant of John A. Roeb-ling, Trenton, N. J., engaged in work for allies, burns; loss \$1,500,000. Incendiarism suspected.
- Jan. 28—German auxiliary cruiser Prinz Eitel Friedrich sinks American ship William P. Frye and brings its crew to American port.
- Feb. 2—Attempt to blow up international railroad bridges between Vanceboro, Me., and New Brunswick, Canada, confessed by Werner Horn, German captain.
- Feb. 4—Germany proclaims waters surrounding Great Britain and Ireland to be war zone and says that on and after Feb. 18 "every enemy merchant ship found in said zone will be destroyed, it not always being possible to avert dangers that threaten crews and passengers. Even neutral ships are exposed to danger in war zone, as in view of misuse of neutral flags ordered Jan. 31 by British government, and of accidents of naval war it cannot always be avoided to strike even neutral ships in attacks that are directed at enemy ships."
- Feb. 10—United States replies to German proclamation, warning Germany the destruction of American vessels or loss of American life is an indefensible violation of neutral rights and that the United States will hold Germany to strict accountability for all such acts.
- Feb. 16—Germany protests to the United States against British blockade; justifies its submarine campaign on ground of "starvation methods" of allies; says it is not the intention of Germany to destroy neutral lives and neutral property.
- Feb. 19—American freight ship Evelyn, carrying cotton from New York to Bremen, strikes mine in North sea; one life lost.
- Feb. 19—Great Britain explains that American flag was raised on liner Lusitania at request of American passengers and that this practice has been recognized heretofore as permissible in an emergency.
- Feb. 20—United States sends identical notes to Great Britain and Germany asking that neutral vessels be not endangered; that no floating mines be turned loose; that no anchored mines be placed in high seas; that submarines be not used to attack merchantmen; that no neutral flag be used on belligerent ships; that the nations agree that United States send foodstuffs to American agents in Germany for distribution to non-combatants.
- Feb. 22—American ship Carib sunk at mouth of Ems river, Germany.
- March 1—Germany replies that it would be willing not to use floating mines; refuses to give up anchored mines; sets forth submarine is not to attack merchant ships except to visit and search; sets forth enemy is not to use neutral flag nor to arm its merchantmen; demands that raw material be passed in addition to foodstuffs, the plan for the distribution of which it says "is generally acceptable."

- March 1—France and Great Britain announce that in view of indiscriminate sinking of ships by Germany, allies will hold, detain and take into port ships carrying goods of presumed enemy origin, destination and ownership.
- March 3—Congress creates coast guard and naval reserve.
- March 6—Five men killed in two explosions in Du Pont powder plant at Haskell, N. H., manufacturing for allies.
- March 8—Charles Ruroede pleads guilty in New York to obtaining false passports for German reservists.
- March 15—Great Britain replies to American note of Feb. 20 that it cannot consider acting on it since Germany will not abandon mine laying or submarine warfare. It protests against German acts affecting civilians in Belgium and northern France; mine laying on high seas; mistreatment of British prisoners of war; sinking of British merchantmen; bombarding of defenseless towns, and air raids.
- March 27—American merchantman Falaba, 3,011 tons sunk by submarine; one American life lost.
- March 30—United States issues protest against interference with its trade.
- March 31—The United States presents to Germany a claim for \$228,059 for sinking of the William P. Frye.
- April 1—Five men killed in explosion in plant of Equitable Powder company, Alton, Ill.
- April 2—American ship Greenbrier sunk by a mine immediately after leaving Bremen for New York.
- April 4—Germany protests that food shipments are not reaching her; since American war materials can reach only one group of belligerents she suggests an embargo on all war shipments.
- April 5—Germany offers to put the case of the William P. Frye up to prize court, to which the United States objects.
- April 21—United States replies to German protest against sending munitions that it would not be neutral if it abandoned trade.
- April 22—German embassy at Washington publishes warning in New York newspapers against passengers sailing on Lusitania.
- April 28—American oil tank steamer Cushing, bound from Rotterdam to Philadelphia attacked near Antwerp by German aeroplane, which throws three bombs.
- May 1—American oil tank steamer Gulflight torpedoed by German submarine without warning off Scilly islands; three Americans dead.
- May 7—Cunard liner Lusitania, from New York to Liverpool, torpedoed off Irish coast by German submarine without warning; 114 American lives lost.
- May 12—Guncotton storehouse of Anderson Chemical company, Wallington, N. J., wrecked by explosion; three dead.
- May 13—United States sends first protest to Germany on sinking of Lusitania as not compatible with international law.
- May 25—American ship Nebraskan, chartered to British White Star Line, carrying coal for United States navy, damaged by a German submarine near Ireland.
- May 28—Germany defends sinking of Lusitania, asserting that it carried munitions and traveled too fast to be warned.
- June 9—United States again asks Germany, in second Lusitania note, for assurances that American lives and property will be safeguarded in future.
- June 12—Bernhard Dernburg, German propaganda leader in America, who justified sinking of Lusitania in newspaper interview, departs for Germany via Norway because of his unpopularity.
- June 28—British mule ship Armenian sunk by German submarine; twenty Americans dead.
- June 29—Austria protests to the United States against shipment of munitions to allies; admits America's legal right, but insists action is not neutral, because part of belligerents are cut off from supply.
- July 2—Frank Holt (Erich Muentner) tries to blow up capitol at Washington as protest against making munitions; next day tries to kill J. P. Morgan; commits suicide in jail, July 6.
- July 7—Incendiary fire discovered in hold of transatlantic steamer Minnehaha.
- July 8—Germany promises that American ships in the prosecution of legal voyages will not be hindered; American lives on neutral vessels shall not be placed in jeopardy.
- July 9—Cunard line steamship Orduna, carrying Americans, attacked off Irish coast by submarine with torpedo and shells without warning; uninjured.
- July 12—Germany declares attack on steamer Nebraskan was due to misunderstanding; expresses regret and promises compensation.
- July 13—Public disclosures prove attempts by German sympathizers in United States to destroy by bombs the following transatlantic vessels: Bankdale, Touraine, Devon City, Lord Erne, Cressington, Samland, Lord Devonshire, Kirkoswald and Strathtay.
- July 13—Mixing building of United Safety Powder company at Jefferson, Ky., wrecked; three killed.
- July 21—United States, in third Lusitania note, asks Germany to make reparation for lives lost and disavow act; declares that such another attack will be considered deliberately unfriendly.
- July 25—American ship Leelanaw, from Archangel to Belfast, loaded with flax, torpedoed off the Orkneys.
- July 31—British steamer Iberian, 5,223 tons, sunk; three Americans killed by shell fire; three wounded.
- Aug. 12—United States replies to Austria-Hungary that it is not violating neutrality in making munitions.
- Aug. 16—Five killed in explosion of Sinnamahoning (Pa.) plant of Ætna Explosives company.

Aug. 19—White Star liner Arabic, 15,801 tons, torpedoed; two Americans killed.

Aug. 24—German Ambassador Bernstorff gives out interview in Washington saying loss of American lives on Arabic was "contrary to our intention."

Aug. 29—Two Du Pont powder mills at Wilmington, Del., destroyed; two killed.

Aug. 30—Shrapnel plant of E. J. Dodd company, Baltimore, Md., burned.

Aug. 30—Through discovery of letters carried by James J. F. Archibald and seized by English at Falmouth, United States learns that Dr. Constantin T. Dumba, ambassador of Austria-Hungary to United States, writes his superiors that he has plans under way to "disorganize and hold up for months, if not entirely prevent, manufacture of munitions in Bethlehem, Pa., and middle west, which, in opinion of German attache, is of great importance and amply outweighs expenditure of money involved." Other disclosures also made.

Sept. 1—Germany promises that "liners will not be sunk by our submarines without warning and without safety to lives of noncombatants, provided that liners do not try to escape or offer resistance."

Sept. 4—Steamship Hesperian, 6,124 tons, torpedoed: one American killed.

Sept. 9—President Wilson asks recall of Dr. Dumba, Austro-Hungarian ambassador, on ground of Archibald disclosures.

Sept. 19—Germany, after negotiation in case of the William P. Frye, agrees that amount of damage shall be settled by conference of experts and says submarines have been ordered not to destroy American merchantmen carrying conditional contraband.

Sept. 21—British house of commons makes public thirty-four letters and documents found on Archibald; two from German attache Boy-Ed, and one from Von Papen, German captain.

Sept. 24—Austria-Hungary reiterates protests against America's making of munitions.

Oct. 12—Edith Cavell, English nurse, executed at Brussels in spite of protest of American legation.

Oct. 24—United States secret service men arrest Robert Fay, lieutenant in German army, and others in New York on charge of conspiring to destroy munitions' ships by bombs; Fay, Walter Scholz and Paul Daeche found guilty May 8, 1916.

Nov. 7—Ancona, 8,210 tons, sunk by Austrian submarine; twenty-four Americans killed.

Nov. 10—Machine shop of Bethlehem Steel company, South Bethlehem, Pa., burned with loss of \$5,000,000.

Dec. 3—United States asks Germany to recall Capt. Boy-Ed, military attache, and Capt. Von Papen for "improper activities in military and naval matters." Boy-Ed said to have handled \$750,000 for chartering ships to supply German raiders.

Dec. 3—United States steamer Communi-paw sunk.

Dec. 4—Karl Buenz, Adolf Hochmeister, George Koetter and Joseph Poppinghaus of

the Hamburg-American line convicted of conspiracy to deceive and defraud the United States by supplying German cruisers at sea.

Dec. 5—American oil tank ship Petrolite attacked.

Dec. 6—United States sends Austria note of protest against sinking of Ancona.

Dec. 7—President Wilson advocates preparedness in message to congress.

Dec. 30—British liner Persia sunk by submarine; Robert N. McNeely, newly appointed consul of United States at Aden, Arabia, killed; also Homer R. Salisbury, American missionary.

1916

Jan. 6—Brindisi, Italian steamship, strikes mine; one American killed.

Jan. 7—Germany in official note promises submarine shall insure safety of crews and passengers; if accident prevents this, will make reparation; offers to pay indemnity for Americans lost on Lusitania.

Jan. 27—President Wilson begins speaking tour through country to advocate large volunteer army with reserve of 500,000.

Feb. 10—Austria and Germany announce to United States that after Feb. 29 they will treat armed merchantmen as belligerent ships.

Feb. 17—Lusitania case regarded as settled; Germany agrees to warn liners, but objects to armament.

Feb. 24—President Wilson, in letter to Senator Stone, declares rights of Americans cannot be abridged or denied and that order to Americans to keep off armed merchantmen would be such denial.

March 3—Gore resolution declaring sinking of armed merchant vessel by submarine with loss of American lives cause for war, lost in senate.

March 7—House refuses to consider Mc-Lemore resolution to warn all American citizens against traveling in armed ships.

March 9—One American injured in torpedoing of Norwegian bark Silvius by German submarine.

March 16—Dutch liner Tubantia, with Americans aboard, torpedoed without warning. British merchantman Berwindale, with four Americans aboard, torpedoed.

March 24—French channel steamer Sussex torpedoed without warning; Americans injured. British merchantman Englishman torpedoed; one American killed.

March 27—United States asks Germany if her submarine sank the Sussex.

March 27—British merchantman Manchester Engineer, with Americans aboard, sunk without warning by torpedo.

March 28—United States asks Germany if her submarine sank the Englishman.

March 29—United States asks Germany if her submarine sank Manchester Engineer.

March 31—Horst von der Goltz, alleged German spy, discloses plot to invade Canada, destroy Welland canal; admits enlisting Germans in Baltimore and elsewhere.

April 1—United States asks Germany if her submarine sank British steamer Eagle Point, with Americans aboard on March 28.

April 1—United States asks Germany if her submarine sank British steamer Berwindale, with Americans aboard on March 16.

April 11—Germany replies Berwindale tried to escape submarine; Englishman tried to escape; Manchester Engineer not established; Eagle Point tried to escape; Sussex sinking not yet traced to submarine.

April 18—United States furnishes proof that German submarine sank Sussex; threatens breach of diplomatic relations if similar sinking is repeated.

April 19—President Wilson goes before congress to explain details of submarine controversy and warning to break relations.

April 19—Government officers in New York seize papers of Wolf von Igel, former secretary to Capt. von Papen; German ambassador asks for papers on ground of diplomatic immunity; government offers to give him any that he can identify as belonging to embassy.

May 4—Germany announces submarine commanders have received orders not to sink ships without warning and saving human lives, unless they offer resistance or attempt to escape.

May 9—Germany in detailed statement declares all ships encountered by submarines will be dealt with according to international law; if neutral is damaged Germany will make reparation without recourse to a prize court or submit to international arbitration.

May 13—New York holds first preparedness demonstration in country with 125,683 men in line.

May 16—Batavier V., Dutch liner, sunk by mine; one American killed.

June 3—Chicago preparedness demonstration with 130,214 men in line.

June 3—Chamberlain army bill providing for volunteer army and federalized national guard, becomes law.

June 12—Congress appropriates \$200,000,000 for training national guard.

July 1—Act drafting national guard into regular army becomes a law.

July 31—Dutch liner, Koenigin Wilhelmina, with American aboard, torpedoed.

Aug. 29—Act increasing navy becomes law; adds 157 ships; ten battle ships; six battle cruisers; ten scout cruisers; fifty destroyers; nine fleet submarines; fifty-nine regular submarines.

Sept. 2—British merchantman Kelvina, with twenty-eight Americans aboard, sunk by mine or torpedo.

Sept. 7—Shipping board to encourage naval auxiliary formed.

Sept. 8—Emergency revenue act becomes law; provides for special munitions tax, etc.

Oct. 7—German war submarine U-53 puts in at Newport, R. I.; on Oct. 8 it sinks Strathdene, British; West Point, British; Stephano, British; Bloomersdyk, Dutch, and Christian Knudsen, Norwegian. United States destroyers rescue survivors. Ste-

phano had many Americans abroad, returning from vacation in Newfoundland.

Oct. 19—Aulania, British merchantman, sunk without warning in English channel; twenty-one Americans aboard.

Oct. 28—American ship Lanao sunk off Portsmouth by submarine.

Oct. 28—British steamer Marina sunk without warning by German submarine; six Americans killed.

Nov. 7—American steamer Columbian shelled and sunk by German submarine off Spanish coast.

Nov. 26—American merchantman Chemung sunk off Andalusia.

Nov. 26—Germany refuses to give United States Consul Pike right to cross Germany from Warnemunde to Switzerland.

Nov. 29—United States sends protest against deportation of Belgians to Germany.

Dec. 4—Italian steamship Palermo, with twenty-five Americans aboard, sunk.

Dec. 14—British ship Russian, with seventeen Americans aboard, sunk.

1917

Jan. 11—Franz Bopp, German consul-general at San Francisco, and Baron George W. von Brincken, convicted of conspiring to injure American shipping, munitions, plants, etc., and sentenced to two years' imprisonment.

Jan. 19—British steamer Yarrowdale sunk; seventy-two American seamen taken as prisoners to Germany.

Jan. 22—President Wilson addresses senate on a world league for peace; proposes a peace without victory.

Jan. 31—Germany gives United States Ambassador Gerard in Berlin six hours' notice of opening of ruthless submarine warfare; declares ships will be sunk within specified zone around British Isles whether neutral or not if submarine has not time to warn or allow men to escape.

Feb. 3—In view of Germany's summary breaking of pledges regarding safety of neutrals in submarine zone President Wilson breaks diplomatic relations and gives Ambassador Bernstorff his passports. The latter was given safe conduct to Germany.

Feb. 3—American merchantman Houstatonic sunk by submarine.

Feb. 13—American merchantman Lyman M. Law sunk by German submarine.

Feb. 21—Publication is made of intercepted note from German Foreign Secretary Zimmermann to German minister in Mexico City, dated Jan. 19, 1917, proposing alliance between Mexico, Japan and Germany and suggesting Mexico be paid by annexation of American southwestern states for co-operation with Germany.

Feb. 25—Spanish embassy in Berlin informed men from Yarrowdale had been released. Men reached Switzerland March 11; complained of cruel treatment as prisoners of war.

Feb. 26—British steamer Laconia sunk; five Americans killed.

March 2—American merchantman *Algonquin* sunk by German submarine with shell fire and bombs; crew escapes.

March 8—Dr. Chakraborty, prominent in Indian independence movement, admits getting \$60,000 in New York from Wolf von Igel, German agent, to start trouble in India.

March 9—President Wilson orders navy department to arm American merchant vessels.

March 9—President Wilson calls congress to meet in extraordinary session April 16.

March 12—United States serves formal notice on neutrals of severance of relations with Germany and asks neutral support.

March 14—China informs United States it has severed diplomatic relations with Germany. American influence accomplished this.

March 17—First armed American liner, *St. Louis*, leaves New York, carrying naval gun crew under decision of president allowing American ships to arm.

March 18—Three American ships sunk by submarine—*City of Memphis*, Illinois and *Vigilancia*; fifteen members of *Vigilancia* crew lost.

March 21—President Wilson calls congress to meet April 2, instead of April 16.

March 22—American oil ship *Healdton*, with cargo worth \$2,150,000, sunk by submarine; seven Americans killed.

March 22—Immense mass meeting in New York demands action against Germany; 12,000 pledge loyalty.

March 22—Capt. Franz Rintelen of German navy and two others convicted in New York of conspiracy to interfere with shipment of munitions.

March 24—President Wilson orders Brand Whitlock, United States minister, and all consuls in Belgium to leave.

March 25—President Wilson signs bill to increase navy personnel by 26,000 men to 87,000.

March 25—War department calls units of national guard in nine states and District of Columbia; 13,000 men.

March 26—War department calls 25,000 men.

March 30—The federal government calls on all government employes, totaling 500,000, to aid secret service department in detecting spies and plots.

April 1—American steamer *Aztec*, 3,722 tons, value \$500,000, sunk off Brest; twenty-eight men, including Boatswain's Mate Eopulucci, of United States naval guard, dead.

April 2—Six Germans convicted in New York of conspiracy to destroy munitions ships by bombs, among them the chief engineer of the German steamship *Friedrich der Grosse*, and four assistant engineers.

April 2—The 65th congress meets in special session and President Wilson asks it to declare that a state of war exists between the United States and Germany.

April 4—American merchantman *Missourian*, left Genoa April 4, 4,981 tons, sunk without warning in Mediterranean.

April 4—Senate votes war resolution.

April 5—Disclosures made showing that an office for the issuance of fraudulent American passports to German reservists was maintained by Hans von Wedell and others under the supervision of Capt. von Papen and with the assistance of Wolf von Igel.

April 5—Belgian relief ship *Trevier*, 2,991 tons, carrying food to Belgium, torpedoed.

April 6—House votes war resolution.

April 6—War measure signed by President Wilson. Formal war proclamation is issued.

The Nation at War. When war was imminent the administration called for volunteers to join the regular army, the navy and the marine corps, but the decision to enter the war on a major scale brought with it the necessity of a new military policy. The President therefore asked Congress to pass a selective draft law. Such a bill passed both Houses, and was signed by the President on May 18. On June 5 about 10,000,000 men between the ages of twenty-one and thirty-one were registered, and selections for a new national army were soon under way.

The government established sixteen training camps for drilling the national guard (state militia) units, sixteen for training the army to be selected from conscription, and eighteen great aviation fields. On September 2, the first detachments of 600,000 selected men were sent to the training grounds; in May, 1918, the second contingent of 583,000 was called. The regulars were mobilized earlier.

In the meantime Major-General John J. Pershing, who had served during the preceding year in Mexico, was appointed commander in chief of American forces to be sent to France. On June 27 the first contingent reached French soil, and Pershing was raised to the rank of general.

It was announced that Secretary of War Baker was prepared to have 2,000,000 soldiers in France by the autumn of 1918. Secretary Baker visited France in March and April, 1918, to acquaint himself with the actual conditions. In May Congress provided ample appropriations for an army of between 3,000,000 and 5,000,000 men, should such a host be needed.

First American Losses. In October, 1917, the American nation was informed that after months of training its first soldiers had been sent to the battle front. The location selected for them, while requiring confidence and technical skill, was in a comparatively quiet sector almost on the Franco-German

border east of Nancy. On November 3 they had a spirited encounter with German troops in a trench-raiding enterprise, in which the latter were repulsed. Three Americans—Privates Thomas F. Enright, Pittsburgh, Pa., James B. Gresham, Evansville, Ind., and Merle D. Hay, Glidden, Iowa—were killed, eleven were wounded, and a like number were captured by the enemy. The number of Americans whose training was completed increased rapidly from that time, and many divisions were in the battle line when the great German offensive began in March, 1918.

First Losses at Sea. Before the end of 1917 the ability of the government to send soldiers to France was limited only by the transport service. In September the United States commandeered and placed in commission sixteen passenger vessels belonging to Germany and Austria which had been interned in American waters, thus materially adding to the allied overseas fleet. Among these was the *Vaterland*, the largest vessel afloat; this boat was renamed the *Leviathan*. The carrying capacity of the sixteen was about 50,000 soldiers. Before the end of the year troop movements were greatly accelerated and until February 6 not an American soldier had been lost enroute to France through submarine-infested waters. On that day the steamer *Tuscania*, one of many ships in care of a British convoy, was sunk by a torpedo off the north coast of Ireland. There were 2,179 United States troops of the 32nd Division aboard and all except 171 were saved.

"Liberty" Loans. Upon entry into the war hitherto unheard-of appropriations of money were required to maintain a vast army and greatly increased navy. Before many months had elapsed the United States government was spending over \$1,000,000,000 per month, including loans to allied nations. To meet such expenditures income taxes were increased, many internal revenue taxes were more than doubled, many special taxes were levied and the nation began to borrow money from its citizens.

These bonds were appropriately called "Liberty" bonds. The first loan was called for June 15, 1917, and \$2,000,000,000 was solicited. It was more than 50 per cent oversubscribed, the amount realized being \$3,035,226,850; the interest rate was 3½ per cent. The second loan was called for October 28, for \$3,000,000,000. This, too, was as



Private Enright, Private Gresham, Private Hay, we salute you! Yours have become imperishable names upon the Roll of Honor, for to you belongs the proud distinction of having been the first of this nation's forces in France to make the supreme sacrifice.

While cannon boomed a grim accompaniment, the profound thanks of a great sister nation went out to you from the lips of that French commanding officer who officiated at your simple burial—

"In the name of the —th division, in the name of the French army, and in the name of France I bid farewell to Private Enright, Private Gresham and Private Hay of the American army.

"Of their own free will they had left a prosperous and happy country to come over here. They knew war was continuing in Europe; they knew that the forces fighting for honor, love of justice, and civilization were still checked by the long-prepared forces serving the powers of brutal domination, oppression and barbarity. They knew that efforts were still necessary. They wished to give up their generous hearts and they had not forgotten old historical memories, while others forgot more recent ones. * * * We will therefore ask that the mortal remains of these young men be left here, left with us forever. We inscribe on the tombs, 'Here lie the first soldiers of the republic of the United States to fall on the soil of France for liberty and justice.' The passerby will stop and uncover his head. Travelers and men of heart will go out of their way to come here to pay their respective tributes.

"Private Enright! Private Gresham! Private Hay! In the name of France, I thank you. God receive your souls! Farewell!"

heavily oversubscribed, the amount realized being \$4,617,532,300; the interest rate was 4 per cent. The third loan was for \$3,000,000,000, called for May 4, 1918. It realized

about \$4,000,000,000, and was one-third oversubscribed. The interest was $4\frac{1}{4}$ per cent. In September the fourth loan of \$6,000,000,000 was called, this, too, being oversubscribed. After hostilities ceased a fifth loan, appropriately called the "Victory Loan," calling for \$4,500,000,000, was oversubscribed.

In addition to these major loans, the government inaugurated during the same period the sale of "thrift" stamps of 25 cents face value, to be exchanged in quantities for \$5 bonds, called "baby" bonds, to mature in five years.

Aircraft Program. One of the earliest appropriations of Congress was for \$640,000,000 to build factories for the production of flying machines for war purposes and to manufacture them in large quantities. A superior engine was produced and it was named the "Liberty" motor. The public was led to expect production on a large scale by January, 1918, but in this department of war activity the results achieved in a year were exceedingly disappointing. Several thousand machines were built during that time for students in the national aviation camps, but until the late summer of 1918 there were no battle, bombing or observation planes in Europe. Hundreds of American aviators in France were provided with machines of British and French manufacture.

Work of the Navy. Immediately following the declaration of war the American navy was ready for active duty. In May a large number of torpedo-boat destroyers, submarine chasers and vessels of larger size were sent into European waters to oppose with the British and French the submarine menace. In command of the American contingent was Vice-Admiral Sims. Between 1914 and 1918 the navy was increased over one hundred per cent in number of vessels, though not in tonnage, and the personnel was more than trebled.

Early Campaigns of 1918. Germany prepared for a supreme offensive in the spring, and the entente allies prepared for it as best they could, but knew not at what points between the North Sea and Switzerland to expect it. That it would prove the supreme test of the war was deemed certain, for Germany had moved scores of divisions of troops from the Russian front to face its foes in France. The strength of the Central Powers in France was estimated at 220 divisions, or

about 2,500,000 fighting men, with great reserve forces to fill ranks thinned in battle. In the approaching crisis the American General Pershing placed his entire command and all supplies he possessed at the disposal of the allies. General Ferdinand Foch of the French Army was placed in supreme command of the unified allied forces, and he was given the title of marshal.

On March 21 the German offensive began on a 50-mile front in Northeastern France, of which Amiens was practically the center and one important objective. German troops in close formation, assisted by thousands of great guns, rolled in great waves westward and by April 9th the British, who had been selected as the first Teuton opponents, were pushed back in places about twenty-five miles. It was the German plan to separate the British and French armies, then to render the former non-effective. Afterwards the French could be brought to terms.

Early in April the British elected to make a stand. They had retired in good order and the armies were intact. The Germans, who had advanced in solid formation, suffered immense losses, and were forced for a time to suspend their assaults to reform their divisions. On April 21, with "backs to the wall," the British succeeded in halting the progress of their enemy in a battle which it is said astounded the German high command. In Belgium Hindenburg's forces had taken Messines Ridge and Kemmel Hill, two very important heights, but they could at the time go no farther. Another period of time elapsed for a second realignment of forces. Amiens was yet nine miles west of the foremost German lines, and Ypres was still three miles within the allied lines.

On May 27 the Germans renewed their offensive on a scale nearly as ambitious as that of March 21, on a front of forty-eight miles. Over 800,000 men were hurled against the allies, with an equal number in reserve. The main offensive was directed towards Paris; in four days twenty-six miles were gained, and the Germans were again on the Marne River on June 1, from which they had been driven in 1914. On June 9 another offensive gained a few more miles; it was then definitely halted.

Attack on Zeebrugge. In April, 1918, a detail of ships from the British navy made a spectacular attack on the heavily-protected submarine bases of the Germans at Ostend



THE FINAL BATTLE LINE

The dotted line represents the Western limits reached in the tremendous German drive which began on March 21 and ended the middle of July. Thereafter Marshal Foch and his allied armies were masters of the situation and their enemy forces were driven steadily and persistently back toward Germany. The solid, heavy line indicates the battle front on the day the armistice was signed. The broken lines are territorial boundary lines.

and Zeebrugge. At the latter point, particularly, the Englishmen scored heavily. They sank three obsolete vessels filled with cement in the harbor entrance, destroyed a section of the mole and severely damaged a number of German light war vessels and much of the military defenses. The defenders were completely surprised. It was the most daring exploit of any naval contingent in the war. On May 10, the feat was repeated at Ostend, with heroism equally great; an obsolete warship cement filled, was sunk in the harbor mouth.

The Last Days. On June 1 the Germans were within forty-six miles of Paris. The speed of their gigantic drive was slackened, and in succeeding efforts they gained a total of only fifteen miles, which brought them within thirty-one miles of the French capital. At this point the forces of the United States began to make their presence felt. The first thrilling move by a wholly American contingent was at Belleau Wood, where United States marines fought with such valor and

success that the grateful French republic renamed the spot the "Wood of the American Marines." The encounter which finally stopped the German advance and which marked the turning point of the war was the exploit of American marines, in the second Battle of the Marne on July 21, when they threw back the advancing enemy at Chateau Thierry. Together the Americans and the French pushed this advantage so rapidly that before the end of the month the German Crown Prince fled from the Marne salient and withdrew his army as rapidly as possible.

The above successes immediately stiffened the allied lines, and what had been for three months a desperate defense was turned into an offensive movement from the North Sea to Switzerland which the German high command could not slacken. Mile by mile, day after day, the German forces retreated, but offered vicious rear-guard engagements in which many thousand machine guns were employed to stop the advancing allies.

In September a new American man-power bill became effective, the selective draft having been extended to men from thirty-one to forty-five. Foch knew that he had unlimited reserves to fall back upon, and the offensive against the Germans was pressed with vigor. One by one the cities of France which had been dominated by the Germans for four years were retaken. Soissons, Cambrai, Saint Quentin, Noyon, Lens and Lille again became French, and the famous "Hindenburg line" was permanently broken.

On September 13 the American First Army corps were assigned the task of driving the Germans from the southern end of the battle line. In two days they cleared the Saint Mihiel salient and later attempted the most difficult task of driving the foe from the hilly Argonne Forest region, north of Verdun. The attention of the world was turned more particularly to the spectacular retreat of the Germans farther north, but the American task in the Argonne region, one of the stiffest fighting problems of the entire war, was a highly important adventure. Metz was the objective of the Americans, and had not the surrender of the Germans occurred on November 11, the Americans would eventually have reached it. On the day before the armistice was signed they entered Sedan, the historic city which had witnessed the disastrous battle which imposed a German peace upon France in 1871.

In Belgium, meanwhile, Field Marshal Haig and King Albert were driving the Germans out of the country that had first felt the brunt of the war. By November 9 (see accompanying map), the Germans had not only abandoned the coast, but retired from the whole country west of Ghent. Had not the Germans secured an armistice on November 11 their armies would have suffered an overwhelming defeat, a fact the new German government admitted in August, 1919. Their position was rendered doubly precarious by the downfall of their three allies.

Collapse of Bulgaria. In the middle of September an allied army made up of French, British, Italian, Greek, Serbian, Czecho-Slovak and Jugo-Slavic forces under General Franchet d'Esperey, began a vigorous offensive against the Bulgarian forces in Macedonia. The Bulgars were soon in full retreat, and when Sofia itself was threatened the Bulgarian government asked for an ar-

mistice. On September 30 fighting ceased, the Bulgars having surrendered unconditionally. The capitulation of Bulgaria opened the way for the liberation of Serbia, Montenegro and Rumania, destroyed Germany's *Mittel Europa* plans, cut off direct communication with Turkey and paved the way for the collapse of both Austria and Germany.

Surrender of Turkey. After the capture of Jerusalem, at the close of 1917, General Allenby began extensive preparations for a campaign to put Turkey out of the war. In the later operations he was assisted by Arabian forces, as the kingdom of Hedjaz (see ARABIA) had declared its independence of Turkey in November, 1916, and had become a valued member of the entente. In September British and Arabs began an advance in Mesopotamia and Palestine, which came rapidly to a climax. Toward the close of the month the British reached the Sea of Galilee, while the Arabs carried everything before them east of the Jordan. In October Damascus fell; later in the month Aleppo, the Turko-German base for the armies in Asia Minor, was captured, and about the same time the Turks were completely defeated along the Tigris, and communications with Mosul were cut.

In view of the breakdown of their forces, the Turks could no longer hold out, and asked for an armistice. General Townshend, who had been a prisoner since the surrender of Kut-el-Amara, bore the note asking for terms, which he delivered to the allied commander of the Aegean fleet. Negotiations were held on the island of Lesbos, and terms were signed on October 30. Among the armistice provisions was the opening of the Dardanelles to the allies.

Austria-Hungary Capitulates. The closing weeks of the war saw Italy retrieving the great disaster of 1917. In June the Austrians began an attack on the Asiago Plateau and along the Piave River, but the movement failed. On October 24 the Italians, with help of a few divisions of their allies, began a major offensive against the Austrians, which developed into one of the most brilliant victories of the war. Trent, Udine and Trieste were occupied, and the Austro-Hungarian army was routed.

Austria-Hungary asked for an armistice on October 31, and terms were accepted on November 1. As one of these terms granted

the allies the right to occupy any Austrian territory desired, the armistice made an invasion of Germany from the south a near possibility. The Germans, who were losing their own fight, saw the hopelessness of continuing the struggle, and they, too, accepted drastic armistice terms.

Germany Asks for Peace. As soon as the surrender of Bulgaria became known in Germany there was a political upheaval, Chancellor von Hertling resigning, and Prince Max of Baden, a moderate man of democratic tendencies, succeeding him on October 2. A coalition Ministry was formed, in which the Social Democrats were represented by Scheidemann and Bauer. On October 5 President Wilson was requested to take steps for the restoration of peace. A series of notes between Germany and the United States followed, in which President Wilson obtained sweeping concessions from the German government, such as promises to cease attacks on merchant ships, to evacuate all occupied territory and to accept those principles which had been laid down in various war messages. On November 5 the allied and associated governments authorized Marshal Foch to state the terms on which they would enter into an armistice. German envoys were at once sent to French headquarters, and on November 11 they signed the following allied demands:

Evacuation within fourteen days of Belgium, France, Alsace-Lorraine and Luxemburg.

Surrender of 5,000 guns, half field and half artillery; 25,000 machine guns; 3,000 flame throwers, and 1,500 airplanes.

Surrender of 5,000 locomotives, 150,000 cars, 50,000 wagons and 10,000 motor lorries.

Surrender of railways of Alsace-Lorraine and stores of coal and iron there.

Immediate return of allied prisoners, but German prisoners not to be returned before peace was signed.

Evacuation of west bank of the Rhine, the allies to hold the crossing of the river at Coblenz, Cologne and Mayence for a twenty-mile radius.

The east bank of the Rhine to become a neutral zone and to be evacuated in nineteen days.

German troops to retire at once from any occupied territory which before the war belonged to Russia, Rumania and Turkey.

The allied force to have access to this evacuated territory.

Abrogation of Brest-Litovsk and Rumanian treaties.

Evacuation of all German forces in East Africa within one month.

Surrender of all German submarines.

Surrender of seventy-four warships, including fifty destroyers, ten battle-ships, six battle cruisers and eight light cruisers.

Restitution for damage done by German armies in invaded territories.

Return of cash taken from the national bank of Belgium.

Return of gold taken from Russia and Rumania.

Summary of the War. The chief events of the War of the Nations are summarized below for ready reference.

1914

June 28—Archduke Francis Ferdinand and wife assassinated in Sarajevo, Bosnia.

July 28—Austria-Hungary declares war on Serbia.

Aug. 1—Germany declares war on Russia; general mobilization begun.

Aug. 4—State of war between Great Britain and Germany is declared; Germany declares war on Belgium.

Aug. 8—Germans capture Liege.

Aug. 20—German troops enter Brussels.

Aug. 23—Japan declares war on Germany; Russians victorious in East Prussia.

Aug. 26—Large part of Louvain destroyed by Germans.

Aug. 28—British win naval battle near Helgoland.

Aug. 29—Germans inflict heavy defeat on Russians at Allenstein; Germans occupy Amiens.

Sept. 1—Germans win decisive victory at Tannenberg, East Prussia; cross the Marne in France.

Sept. 2—Lemberg captured by Russians; seat of French government transferred from Paris to Bordeaux.

Sept. 5—England, France and Russia sign compact not to conclude peace separately.

Sept. 6—Allies win battle of Marne.

Sept. 7—Germans retreat from the Marne; capture Maubeuge.

Sept. 7-10—Germans retreat to the Aisne.

Sept. 14—Battle of Aisne begins; pursuit by allies halted.

Sept. 15—First battle of Soissons fought.

Sept. 18—Germans bombard Reims and damage cathedral.

Sept. 19—Battle of Aisne develops into continuous trench fighting.

Sept. 20—Russians capture Jaroslau and begin siege of Przemysl.

Sept. 22—British cruisers Cressy, Aboukir and Hogue torpedoed and sunk in the North sea.

Oct. 9-10—Germans capture Antwerp.

Oct. 12—Germans capture Ghent.

Oct. 20—Fighting along the Yser river begins.

Oct. 29—Turkey begins war on Russia.

Nov. 1—British cruisers Good Hope and Monmouth sunk off Coast of Chile.

Nov. 7—Tsingtao captured by Japanese.

Nov. 9—German cruiser Emden destroyed.

Dec. 8—German cruisers sunk near Falkland islands by British fleet.

Dec. 9—French government officials return to Paris.

Dec. 14—Belgrade recaptured by Serbians.
 Dec. 17—Britain formally assumes a protectorate over Egypt.
 Dec. 25—Italy occupies Avlona, Albania.

1915

Jan. 1—British battleship Formidable sunk.
 Jan. 11—Heavy fighting northeast of Soissons.
 Jan. 24—British win naval battle in North sea, sinking the German cruiser Bluecher and damaging two other cruisers.
 Feb. 11—Germans evacuate Lodz.
 Feb. 12—Germans drive Russians from positions in East Prussia, taking 26,000 prisoners.
 Feb. 19—British and French fleets bombard Dardenelles forts.
 March 1—Premier Asquith announces blockade by allies of all German, Austrian and Turkish ports.
 March 10—Battle of Neuve Chapelle begins.
 March 14—German cruiser Dresden sunk.
 March 18—British battleships Irresistible and Ocean and French battleship Bouvet sunk in Dardanelles strait.
 March 22—Fortress of Przemyśl surrenders to Russians.
 April 23—Germans force way across Ypres canal at Steenstraete and Het Sas.
 May 2—Austro-Hungarian and German forces repulse Russians along the entire front of Malatow, Gorlice, Gromik and north of these places in West Galicia.
 May 7—Liner Lusitania torpedoed and sunk by German submarine.
 May 23—Italy formally declares war on Austria and orders mobilization of army.
 June 3—Przemyśl recaptured by Germans and Austrians.
 June 22—Germans and Austrians capture Lemberg.
 July 3—Tolmino falls into hands of Italians.
 July 29—Warsaw evacuated; Lublin captured by Austrians.
 Aug. 2—Germans occupy Mitau.
 Aug. 3-9—Battle of Hooge.
 Aug. 4—Germans occupy Warsaw.
 Aug. 5—Ivangorod taken by Germans.
 Aug. 6—British land at Suvla bay, Gallipoli.
 Aug. 17—Germans capture Kovno.
 Aug. 19-20—Germans take Novo Georgievsk.
 Aug. 26—Germans take Brest-Litovsk.
 Sept. 2—Germans capture Grodno.
 Sept. 5—Grand Duke Nicholas sent to the Caucasus.
 Sept. 8—Russians stop Germans at Tarnopol.
 Sept. 19—Germans capture Vilna.
 Sept. 20—Austrians and Germans begin drive on Serbia.
 Sept. 25-30—Battle of the Champagne.
 Oct. 9-10—Austro-Germans capture Belgrade.
 Oct. 12—Edith Cavell executed by Germans.
 Oct. 13—Bulgaria declares war on Serbia.
 Oct. 22—Bulgarians occupy Uskub.
 Nov. 7—Italian liner Ancona sunk.
 Nov. 22—British victory near Bagdad.
 Nov. 30—Bulgarians take Prizrend.
 Dec. 1—British retreat from Bagdad.
 Dec. 8-9—Allies defeated in Macedonia.

Dec. 15—Sir John Douglas Haig succeeds Sir John French.
 Dec. 27-30—Heavy Russian offensive in Galicia and Bessarabia.
 Dec. 30—Liner Persia sunk in Mediterranean.

1916

Jan. 6—Russians capture Czartorysk.
 Jan. 8—British troops at Kut-el-Amara surrounded.
 Jan. 9—British evacuate Gallipoli peninsula.
 Jan. 10—Austrians capture Mount Loveen in Montenegro; dreadnought King Edward VII sunk.
 Jan. 13—Cetinje, capital of Montenegro, captured by Austrians.
 Jan. 23—Scutari, capital of Albania, captured by Austrians.
 Feb. 15—Erzerum captured by the Russians.
 Feb. 21—Germans under crown prince begin attack on Verdun defenses.
 Feb. 26—Germans capture Fort Douaumont; French transport La Provence sunk.
 March 2—Bitlis captured by Russians.
 March 16—Admiral von Tirpitz resigns.
 March 24—Sussex torpedoed and sunk.
 April 5-7—Battle of St. Eloi.
 April 17—Trebizond captured by Russians.
 April 18—President Wilson sends final note to Germany.
 April 19—President Wilson explains diplomatic situation in speech before congress in joint session.
 April 24—Insurrection in Dublin.
 April 29—British force at Kut-el-Amara surrenders to the Turks.
 April 30—Irish insurrection suppressed.
 May 3—Several leaders of Irish revolt executed.
 May 15—Austrians begin offensive against Italians in Trentino.
 May 31—Great naval battle off Danish coast.
 June 3—Germans assail British at Ypres; Russians under Gen. Brussiloff begin successful offensive.
 June 5—Lord Kitchener lost with cruiser Hampshire.
 June 6—Italians stop enemy in Trentino.
 June 11—Russians capture Dubno.
 June 18—Russians capture Czernowitz.
 June 25—Gen. Brussiloff's army completes possession of Bukowina.
 July 1—Battle of Somme begins.
 July 25—Erzingan captured by the Russians.
 July 26—Pozières taken by British.
 July 27—British take Delville wood; Serbs begin attack on Bulgars in Macedonia.
 Aug. 2—French take Fleury.
 Aug. 3—Sir Roger Casement executed for treason.
 Aug. 5—British win victory north of Pozières.
 Aug. 9—Italians take Goritz by assault.
 Aug. 15—Russians capture Jablonitza.
 Aug. 18—Serbs capture Florina from Bulgars.
 Aug. 24—French take Maurepas.
 Aug. 27—Italy declares war against Germany.
 Aug. 28—Roumania declares war against Austria-Hungary.
 Aug. 30—Roumanians take Kronstadt in Transylvania; Bulgars seize Drama.

Sept. 2—Roumanians take Orsova and Hermannstadt.
 Sept. 3—Allies take Guillemont and Clery.
 Sept. 7—Germans capture Tutrakan.
 Sept. 9—French recapture Fort Douaumont.
 Sept. 10—German-Bulgar forces take Silistria.
 Sept. 15—British take Flers, Martinpuich and Courcellette; French reach outskirts of Ran-court.
 Sept. 17—French take Vermandovillers and Berny.
 Sept. 25—British capture Morval and Les Boeuifs.
 Sept. 26—French and British take Combles; British take Thiepval and Guedecourt.
 Sept. 28—Venizelos proclaims provisional government in Greece; to aid allies.
 Sept. 30—Germans defeat Roumanians at Hermannstadt.
 Oct. 8—Germans recapture Kronstadt from Roumanians.
 Oct. 11—Germans defeat Roumanians in Alt valley and begin invasion of Roumania.
 Oct. 13—Italians win victory on Carso plateau.
 Oct. 23—Germans capture Constanza.
 Oct. 24—Germans take Predeal.
 Oct. 25—Germans capture Vulcan pass.
 Nov. 3—French reoccupy Fort Vaux.
 Nov. 12—French take all of Saillisel.
 Nov. 13—British win battle of Ancre.
 Nov. 19—Monastir taken by Serbs, French and Italians.
 Nov. 24—Germans capture Orsova and Turnu-Severin.
 Nov. 25—Venizelist provisional government in Greece declares war on Germany.
 Nov. 28—Seat of Roumanian government removed from Bukharest to Jassy.
 Dec. 3—Battle of Argesu won by Germans.
 Dec. 5—British cabinet resigns.
 Dec. 6—Bukharest occupied by German forces.
 Dec. 10—New British cabinet formed with David Lloyd George at its head.
 Dec. 11—Italian battleship Regina Margherita sunk.
 Dec. 12—Germany proposes peace negotiations.
 Dec. 15—French recapture Vacherauville, Louvemont and Fort Hardaumont.
 Dec. 18—President Wilson sends note to belligerent nations asking them to make known their peace terms and to neutral nations suggesting that they support America's action.
 Dec. 28—Germany replies to President Wilson saying a direct exchange of views would be best way to bring about peace—gives no terms.
 Dec. 29—Scandinavian countries express sympathy with President Wilson's suggestions.
 Dec. 30—Allies make joint reply to Germany's peace proposal, rejecting it as a war maneuver.

1917

Jan. 2—Germans complete conquest of Dobrogea.
 Jan. 7—Russians take offensive along Sereth river.
 Jan. 9—British battleship Cornwallis sunk.

Jan. 10—Allies make joint reply to President Wilson and give their peace terms.
 Jan. 11—German government issues note commenting on entente's reply of Dec. 30.
 Jan. 13—Arthur Balfour, British secretary for foreign affairs, sends note commenting on President Wilson's peace suggestions.
 Jan. 14—Galatz under bombardment; German attacks on Riga front fail.
 Jan. 15—Germans defeated on the Sereth river.
 Jan. 17—British advance on both sides of Ancre creek.
 Jan. 20—Germany defends deportations of Belgians; Russians routed at Nanesti.
 Jan. 22—President Wilson addresses United States senate on subject of world peace and the establishment of a league of nations.
 Jan. 23—Battle between British and German destroyers in North sea.
 Jan. 25-30—Fighting on Hill 304 and Mort Homme hill near Verdun.
 Jan. 28—Russians win battle of Monte Cansci; British auxiliary steamer Laurentic sunk.
 Jan. 31—Ambassador Count von Bernstorff hands note to Secretary Lansing in Washington announcing the inauguration by Germany of an unrestricted submarine warfare on Feb. 1; Germany proclaims boundaries of blockade zones.
 Feb. 1—Germany begins unrestricted submarine warfare.
 Feb. 3—President Wilson orders that Ambassador Count von Bernstorff be handed his passports, directs the withdrawal of Ambassador James W. Gerard and all American consuls from Germany and announces his action in a speech before congress; suggests to neutral countries that they follow America's example.
 Feb. 3—American steamer Housatonic torpedoed and sunk.
 Feb. 5—President Wilson forbids transfer of American ships to foreign registry; German ships interned at Manila seized.
 Feb. 7—British capture Grandcourt; German ships interned in American ports found crippled by crews.
 Feb. 8—Germany detains Ambassador Gerard in Berlin; liner California torpedoed and sunk with loss of forty-one lives.
 Feb. 13—Ambassador Bernstorff sails for Germany via Halifax and Norway.
 Feb. 14—Scandinavian countries protest against Germany's sea warfare.
 Feb. 15—Germans under crown prince take a mile and a half of French trenches between Reims and Verdun.
 Feb. 17—British troops capture enemy positions along a front of two miles on both sides of the Ancre.
 Feb. 18—Entrance to New York harbor closed by steel net.
 Feb. 24—British take village of Petit Mirau-mont and advance on a front of a mile; Germans withdraw under cover of fog.
 Feb. 25—"Hindenburg retreat" from Somme sector in full progress; British win at Sannaiyat on the Tigris; British take Serre and Butte de Warlencourt.

Feb. 26—President Wilson appears before congress and asks authority to supply merchant ships with defensive arms and to employ other methods to protect American ships and citizens; British capture Kut-el-Amara.

Feb. 27—British take Gonnecourt.

Feb. 28—The Associated Press reveals German plot to bring Mexico and Japan in alliance against the United States; letter from the German secretary of foreign affairs, Dr. Alfred Zimmermann, to the German minister to Mexico suggesting the plan, published.

March 1—President Wilson, at request of senate, confirms existence of German plot in Mexico; house grants president power to arm merchant ships.

March 2—Germany announces that on March 1 the final limit of grace for sailing vessels on the Atlantic expired; Russians capture Hamadan.

March 3—Foreign Secretary Zimmermann admits authenticity of letter to German minister to Mexico suggesting alliance against the United States.

March 6—British invade Palestine and capture Hebron; United States supreme court decides Appam case in favor of owners.

March 8—Count Ferdinand von Zeppelin dies; French regain trenches in Champagne.

March 9—President Wilson calls a special session of congress for April 16; issues orders for the arming of American merchant ships.

March 10—Belgian relief steamer Storstad torpedoed.

March 11—Successful revolution in Russia; British capture Bagdad; Ambassador Gerard reaches Havana.

March 12—French capture Hill 185 in Champagne; state department in Washington gives formal notice of arming of American ships; American steamer Algonquin sunk without warning by German submarine; China breaks relations with Germany.

March 14—German chancellor promises reforms to Prussian diet.

March 15—Czar Nicholas II. of Russia abdicates throne for himself and son. The action was forced.

March 16—Grand Duke Michael Alexandrovitch renounces assumption of supreme power in Russia; British take St. Pierre Vaast wood; American steamer Vigilancia torpedoed with loss of fifteen lives.

March 17—British take Bapaume; French take Roye; American ship City of Memphis sunk.

March 18—British and French take Peronne, Chaulnes, Nesle and Noyon; make ten mile gain on seventy mile front; Germans destroy everything in abandoned territory; American ship Illinois sunk by submarine.

March 19—American oil ship Healdton torpedoed with loss of a score of lives; French battleship Danton torpedoed with loss of 296 men; British and French continue advance; Germans say retreat is for strategic purposes.

March 20—French and British take a score of villages in their advance.

March 21—President Wilson calls extra session of congress to begin April 2 instead of April 16; "state of war" admitted to exist.

March 22—America recognizes new government in Russia.

March 23—French troops reach vicinity of St. Quentin.

March 24—Washington announces withdrawal of Minister Brand Whitlock and American relief workers from Belgium; constitutional party in Russia votes for republican form of government; Germany extends barred zone to Russian arctic waters.

March 25—President Wilson calls part of national guard in the east into the national service for policing purposes.

March 26—British defeat large force of Turks at Gaza, Palestine; President Wilson calls into federal service 20,000 guardsmen in eighteen central states.

March 27—British advance towards Cambrai; French approach La Fere.

March 29—Chancellor von Bethmann-Hollweg makes speech in reichstag saying that blame will be on America if war comes.

March 30—Foreign Secretary Zimmermann, in reichstag, explains his effort to embroil Mexico and Japan with the United States; German raider Seeadler sends captives to Rio Janeiro; President Wilson and cabinet decide that war with Germany is the only honorable recourse left to the United States.

March 31—More national guard units mobilized in the United States.

April 1—The Aztec, an armed American steamer, sunk by submarine; Russian armies invade Turkey from Persia.

April 2—Special session of American congress opens; president in address asks that existence of a state of war with Germany be declared.

April 3—Russian relief steamer Trevier torpedoed.

April 4—Senate passes war resolution; American steamship Missourian sunk in Mediterranean.

April 5—Brazilian ship Parana sunk by submarine; British and Russian armies in Mesopotamia.

April 6—House passes war resolution; president signs resolution and issues war proclamation; all American naval forces mobilized; German vessels in American ports seized; Germans blow up their auxiliary cruiser Cormoran at Guam.

April 7—Cuba declares war on Germany; Panama declares that it will assist the United States in the defense of the Panama Canal.

April 8—Austria-Hungary announces break in relations with the United States.

April 9—Canadians take Vimy ridge in great British offensive north and south of Arras; Austrian ships interned in American harbors seized; Chile announces it will remain neutral.

April 10—Brazil breaks off relations with Germany; Argentine government says it will support the United States; Eddystone ammunition plant explosion kills 125 persons.

April 11—Costa Rica places its ports at disposal of the United States.

April 12—Bolivia breaks with Germany; Argentine ship Monte Protegido sunk by submarine.

April 13—Barred defense zones around American harbors proclaimed by president; Russian and German socialists dickering on peace terms; British drive Germans back on twelve-mile front near Loos.

April 14—House of representatives passes \$7,000,000,000 war loan bill without opposition; Paraguay expresses sympathy with the United States in the war with Germany; Uruguay condemns German submarine warfare and expresses sympathy with the United States.

April 15—Great French offensive between Soissons and Reims begins; President Wilson issues proclamation warning traitors; British transports Cameronia and Arcadian sunk with heavy loss of life.

April 17—Senate passes war loan bill unanimously; British hospital ships Donegal and Lanfranc sunk.

April 18—Germans driven out of six villages between Soissons and Reims.

April 19—American liner Mongolia sinks German U-boat; Nicaragua indorses entry of United States into war with Germany.

April 20—"American day" in Britain; special services held in St. Paul's cathedral; Berlin admits retirement to "Hindenburg line" in face of allied attacks; two German destroyers sunk off Dover.

April 21—Turkey breaks off relations with the United States; Balfour mission arrives in the United States.

April 22—British mission arrives in Washington; Americans closing missions in Turkey; "United States day" celebrated in Paris.

April 23—British begin new attack on Arras front; British capture Samara.

April 24—Joffre-Viviani French mission arrives in America; President Wilson signs big bond act.

April 25—Joffre-Viviani mission given ovation in Washington; president appoints Elihu Root head of mission to visit Russia.

April 26—Britain withdraws shipping blacklist so far as concerns America.

April 28—Senate and house pass army draft bill; Guatemala severs relations with Germany; Secretary McAdoo announces that bond issues will be called "liberty loan" of 1917.

April 30—Argentine congress adopts resolution in favor of strict neutrality.

May 1—Strikes in munitions factories in Germany reported.

May 3—United States begins making large loans to allies.

May 4—American destroyers arrive in British waters and begin patrol work; Russian council of workmen and soldiers declares

for peace without annexations or indemnities but sustains provisional government. British transport Transylvania sunk with loss of 413 lives.

May 5—Great Britain joins French in asking that American troops be sent to France at once.

May 6—International socialists conferring on peace in Stockholm.

May 9—Liberia ends relations with Germany.

May 10—Secretary Lansing says United States and allies will consider peace terms jointly.

May 11—Congress of Haiti refuses to declare war on Germany.

May 14—Espionage bill passes senate.

May 16—British government suggests two plans for settling Irish question.

May 17—First American Red Cross hospital unit arrives in England for service with the British in France; Honduras severs relations with Germany.

May 18—President Wilson orders the sending of a division of regulars to France under Maj-Gen. J. J. Pershing; issues proclamation fixing June 5 as date for the registry of men eligible for army service under draft law.

May 19—Nicaragua breaks off relations with Germany; Russian provisional government reorganized; President Wilson asks Herbert C. Hoover to take charge of food administration in America during the war.

May 20—German plot for world domination laid bare in Washington; two Chicago nurses killed by gun accident on ship bound for Europe.

May 21—Italian war mission arrives in America.

May 22—United States protests against holding of Americans in Germany; Russian peasants seize lands and burn houses.

May 23—American medical unit received by King George; United States refuses passports to Stockholm socialist conference; house passes war revenue bill calling for \$1,870,000,000.

May 24—Rear-Admiral Wm. S. Sims appointed vice-admiral; plan of raising \$100,000,000 for Red Cross announced.

May 25—German aircraft raid England killing seventy-six persons and injuring 174; President Wilson designates June 18-25 as Red Cross week.

May 26—Italians storm second Austrian line on Carso plateau.

May 27-29—Italian offensive on Carso plateau continues.

May 28—Minister of Finance Shingaroff says Russia faces financial ruin on account of workingmen's demands.

May 29—Brazilian deputies revoke declaration of neutrality.

May 31—Austrian parliament convened; many arrests made of persons opposing operation of conscription law; house defeats press censorship.

June 1—British airmen bombard Zeebrugge and Ostend; split in provisional government in Russia.

June 2—Root commission arrives in Russia.

June 3—British socialists urge peace without annexations.

June 5—Military registration day under selective draft law in the United States; approximately 10,000,000 men registered.

June 6—Lord Northcliffe appointed to represent Britain in America; British resume operations on Arras front.

June 7—British begin great offensive at Messines, storming Wytschaede ridge and exploding great mines.

June 8—Gen. Pershing with staff and clerical force reaches London; force of 100 American aviators reach France; Austrian officers enter Russian lines with peace offers; Germany breaks with republic of Haiti.

June 9—President Wilson's note to Russia outlining American war aims made public.

June 10—British gain more ground around Messines in Ypres region.

June 11—American tank steamer *Petrolite* torpedoed; British take German trench system on mile front east of Messines ridge.

June 12—King Constantine of Greece forced to abdicate his throne.

June 13—Gen. Pershing lands in France; German aeroplanes raid London, killing 157 persons and wounding 430.

June 14—King Constantine leaves Greece.

June 15—Blockade of Greece is lifted.

June 16—Italians capture Corno Cavento in the Trentino; Belgian war mission arrives in United States.

June 17—Two Zeppelins raid British coast; one burned; Londoners demand reprisals for air raids.

June 18—Italians advance northeast of Jamiano.

June 19—Vice-Admiral Sims appointed to take temporary charge of allied naval forces in Irish waters.

June 20—Canadians capture trenches before Lens.

June 22—House passes food control bill; Rumanian mission arrives in America; Elihu Root speaks to large gathering in Petrograd.

June 25—President Wilson appoints exports council; Canadians take German first line trenches in front of Lens.

June 26—Venizelos becomes prime minister of Greece; severe report on Mesopotamian mission issued in London.

June 27—American troops arrive in France; French cruiser *Kleber* sunk by mine; congress of soldiers' and workmen's delegates in Russia declare against a separate peace.

June 28—Brazil revokes neutrality; heavy British attacks near Lens; Rumanian mission arrives in Washington.

June 29—Greece severs relations with Germany and her allies.

June 30—Russians open new offensive in Galicia; eighty-seven German ships seized in American ports turned over to shipping board for operation.

July 1—Russians attack on eighteen-mile front in Galicia.

July 2—President promulgates rules for exemptions in draft; French victory in Czerny.

July 3—Russian drive at Brzezany begins; artillery battle in Ypres salient.

July 4—Germans offensive south of Laon fails; France celebrates July 4; American troops parade in Paris.

July 5—British attack near Ypres.

July 7—German air raid on London kills and wounds many; President Wilson announces export embargo.

July 8—German attack on the Chemin des Dames repulsed.

July 9—President Wilson proclaims mobilization of national guard.

July 11—Germans drive back British troops on the Belgian coast to the Yser, taking 1,250 prisoners; Italians occupy Dalino.

July 12—Chancellor von Bethmann-Hollweg resigns.

July 13—Reichstag refuses to consider war credits.

July 14—George Michaelis becomes German chancellor.

July 17—French take German first and second lines northwest of Verdun.

July 19—Finnish diet declares for independence.

July 20—Draft day in the United States; mutiny causes Russian defeat east of Lemberg.

July 22—Siam declares war on Germany.

July 23—Kerensky appeals to Russian army for support.

July 24—President Wilson accepts resignation of Gen. Goethals from shipping board; many units of Russian army refuse to fight, while the Germans sweep ahead.

July 25—Allied conference begins in Paris.

July 26—Death penalty restored in Russian army; German attack at Dixmude repulsed.

July 27—German aeroplanes raid Harwich; United States shipping board reorganized; Germans take Czernowitz and Kolomea.

July 28—More American troops arrive in France.

July 30—Heavy artillery duel in Flanders; Norwegian mission arrives in Washington.

July 31—British drive in Flanders begun, extending from Warneton to Dixmude.

Aug. 1—Russians begin offensive in Galicia, but retreat in south.

Aug. 2—Germans advance in Bukowina.

Aug. 3—Austrians take Czernowitz; changes made in Russian cabinet; United States shipping board decides to commandeer shipping in American yards; Root mission returns from Russia; premier and nearly whole of Russian cabinet resign.

Aug. 5—Canadians advance on Lens; Kerensky returns to office.

Aug. 6—Kerensky forms new cabinet.

Aug. 7—Liberia declares war on Germany; Mackensen begins attack on Rumanians in Moldavia.

Aug. 8—Canadian senate approves conscription; Russians fall back near the Sereth river.

Aug. 11—Henderson leaves British cabinet.

Aug. 12—German aircraft raid English coast.

Aug. 13—Japanese mission arrives in America on war emergency business.

- Aug. 14—China declares war on Germany and Austria-Hungary.
- Aug. 15—Pope's peace appeal is published; Canadians capture Hill 70, dominating Lens.
- Aug. 16—British and French gain on nine mile front east and north of Ypres.
- Aug. 19—Germans wrecking St. Quentin; Italians begin offensive on Isonzo.
- Aug. 20—French attack on both sides of Meuse in Verdun region, taking Avocourt wood, Le Mort Homme, Corbeaux wood, Cumieres, Talou ridge, Hills 240 and 244, Mormont farm and 4,000 prisoners.
- Aug. 21—Canadians take 2,000 yards of German trenches in outskirts of Lens.
- Aug. 22—German aeroplanes raid Dover, Margate and Ramsgate.
- Aug. 23—Japanese mission arrives in Washington; Russians evacuate Riga.
- Aug. 24—Italians take Monte Santo; French take Hill 304 near Verdun.
- Aug. 25—French take fortified positions near Bethincourt.
- Aug. 26—French take Beaumont wood from Germans; Britons win east of Margicourt.
- Aug. 27—General embargo on exports beginning Aug. 30 proclaimed by the president; full aid to Russia pledged by President Wilson; reply of United States to pope's peace note sent.
- Aug. 28—Civilians flee from Trieste; Canadian conscription bill signed.
- Aug. 29—Italians gain complete control of Bainsizza plateau.
- Aug. 30—President fixes price of wheat.
- Sept. 1—German troops appear on Carso front.
- Sept. 3—Riga captured by the Germans; German planes raid Chatham, England, killing 107 sailors and wounding ninety-two.
- Sept. 4 and 5—German aeroplanes drop bombs on American hospital camp in France, killing five and wounding ten persons; Italians take Monte San Gabriele.
- Sept. 5—I. W. W. offices in many cities raided; first contingents (5 per cent) of national army go to training camps.
- Sept. 7—American liner Minnehaha sunk.
- Sept. 8—State department reveals aid given by Sweden in German minister's plot in Buenos Aires to cause sinking of Argentine ships; French launch new offensive on right bank of the Meuse.
- Sept. 13—State department reveals secret aid given by Swedish charge d'affaires in Mexico to Germany.
- Sept. 14—Premier Kerensky proclaims Russia a republic.
- Sept. 15—British advance east of Westhoek.
- Sept. 20—British advance along Ypres-Menin road to a depth of more than a mile and a half.
- Sept. 21—Secretary Lansing makes public Bernstorff note asking for money with which to bribe congress; replies of Germany and Austria-Hungary to Pope Benedict's peace note made public.
- Sept. 24—Price of steel cut by agreement between manufacturers and war industries board; German aeroplanes and Zeppelins raid England.
- Sept. 27-28—Germans repulsed in counterattacks east of Ypres.
- Sept. 28—British occupy Ramadie on the Euphrates.
- Oct. 1—German air squadrons raid English coast towns.
- Oct. 4—British win on an eight mile front north of Langemarck.
- Oct. 5—French repulse attacks on the Aisne.
- Oct. 6—Extra session of congress ends.
- Oct. 7—Uruguay severs relations with Germany.
- Oct. 9—Mutiny on German fleet made public.
- Oct. 13-17—Germans take island of Oessel.
- Oct. 13—United States destroyer Cassin damaged by torpedo; one life lost.
- Oct. 17—United States transport Antilles sunk; German raiders sink two British destroyers and eight merchantmen in North sea.
- Oct. 18—Germans capture Moon island.
- Oct. 23—French capture Malmaison fort and four villages.
- Oct. 24—Big Austro-German drive against Italian front begun; part of Bainsizza plateau taken.
- Oct. 26—Italians evacuate Bainsizza plateau.
- Oct. 27—Austrian and German troops advance through Julian Alps; 2nd Italian army defeated.
- Oct. 28—German-Austrian forces take Monte Santo, Goritz and Cividale; United States transport Finland torpedoed, but returns to port; nine men killed.
- Oct. 29—Whole Italian Isonzo line falls; Italians retreat to the Tagliamento river.
- Oct. 30—Germans and Austrians take Udine.
- Nov. 1—Germans advance southeastward from Udine; British take Beersheba.
- Nov. 2—American steamship Rochester torpedoed and sunk; Germans retreat from part of the Chemin des Dames; Italians abandon eastern bank of the Tagliamento river.
- Nov. 3—Three Americans killed, eleven wounded and eleven captured by German trench raiding party; British attack Gaza.
- Nov. 4—British advance up the Tigris.
- Nov. 5—Austro-German forces cross the middle Tagliamento river.
- Nov. 6—Italians abandon the Tagliamento line.
- Nov. 7—Austro-Germans reach the Livenza River; British take Gaza.
- Nov. 8—Austro-German forces cross the Livenza river and outflank the Italians.
- Nov. 9—Gen. Armando Diaz made commander in chief of the Italian army in place of Gen. Cadorna; Italians make stand on the Piave river; inter-allied military council formed.
- Nov. 10—Italians yield the east bank of the Piave river; British complete conquest of Passchendaele ridge; British take Askalon.
- Nov. 11—Austro-Germans take Belluno, the Vidor bridgehead and attack Italian positions in the Sette Comuni plateau.
- Nov. 12—Germans and Austrians advance down the Piave to Feltre.
- Nov. 13—Austrians cross the Piave river at Zenson.
- Nov. 14—Americans ambush German patrol on

- French front; Austro-Germans occupy Primoland and Feltre.
- Nov. 15—Italians hold their positions on the Piave river; British take junction of Beer-sheba-Damascus railway.
- Nov. 16—Italians flood lands near Venice to stop advance of enemy.
- Nov. 17-18—Italians repulse attempts of enemy to cross the Piave.
- Nov. 18—British take Jaffa.
- Nov. 19—Italians attack on Asiago plateau.
- Nov. 20—Gen. Haig starts drive on Somme front.
- Nov. 21—British under Gen. Byng take Germans by surprise in Cambrai region advancing five miles and taking thousands of prisoners; German attacks in Monte Grappa region stopped by Italians.
- Nov. 23—Battle of Cambrai continues; German emissaries sent to parley with Russian peace faction.
- Nov. 24—Secret Russian treaties published.
- Nov. 25—French attack near Verdun.
- Nov. 26—British advance near Jerusalem; French and British infantry re-enforcements reach Italian lines.
- Nov. 27—Allied war conference assembles in Paris.
- Nov. 28—Armistice negotiations begun with Germany by bolsheviki; conference of Scandinavian rulers held at Christiania, Norway.
- Nov. 29—German reichstag reassembles.
- Nov. 30—The Germans in a determined attack drive the British back from their positions for a distance of about two miles, nearly to the Bapaume-Cambrai road; at the south end of the new British front the Germans advance through Gonnellieu to Gouzeaucourt; later the British retake Gouzeaucourt and LaVacquerie.
- Dec. 1—British succeed in regaining nearly a mile of the front lost near Gouzeaucourt; several American engineers killed in German attack.
- Dec. 3—London announces officially that "East Africa has been completely cleared of the enemy;" every German colony is now occupied by allied forces; armistice arranged between Russians and Germans.
- Dec. 4—President Wilson asks congress to declare war on Austria-Hungary; Gen. Dukhonin killed by bolsheviki at Mohilev.
- Dec. 5—Teutons launch new offensive on Asiago plateau.
- Dec. 6—Great disaster caused at Halifax by explosion of munitions ship; United States destroyer Jacob Jones torpedoed and sunk.
- Dec. 7—Congress passes resolution declaring state of war to exist between United States and Austria-Hungary; Austrians make gains on the Asiago plateau; Roumania forced to join Russia in peace parley.
- Dec. 8—Government in Portugal overthrown by revolution.
- Dec. 9—Gen. Kaledines begins revolt against Russian bolsheviki; Italians check foe on Asiago plateau.
- Dec. 10—Capture of Jerusalem by British under Gen. Allenby announced.
- Dec. 11—Gen. Allenby formally enters Jerusalem; Japanese troops occupy terminal at Vladivostok.
- Dec. 12—German mass attacks near Cambrai gain 500 yards of British trenches.
- Dec. 14—Permanent allied naval council formed.
- Dec. 15—Armistice signed between central powers and bolsheviki at Brest-Litovsk.
- Dec. 17—Conscriptionists return to power in heavy Canadian vote.
- Dec. 20—Premier Lloyd George addresses parliament on Britain's peace terms.
- Dec. 22—German-Russian peace conference assembles at Brest-Litovsk.
- Dec. 23—Seventh German war loan totaled over \$3,000,000,000.
- Dec. 25—At peace conference Germany proposes with Russia "peace without forcible annexations and indemnities."
- Dec. 26—Vice-Admiral Wemyss appointed First Sea Lord of Britain. Government takes possession of railroads in United States.
- Dec. 17—Turkish army failed to retake Jerusalem.

1918

- Jan. 3—Germany refused to evacuate Russian territory.
- Jan. 7—Earl Reading, Lord Chief Justice of England, appointed special ambassador to the United States.
- Jan. 8—President Wilson addressed congress on peace; specified fourteen "rectifications of wrong and assertions of right."
- Jan. 9—Conscription defeated in Australia.
- Jan. 10—War between Russia and Bulgaria ended; Don Cossacks proclaim republic.
- Jan. 12—Armistice between Russia and Germany extended one month.
- Jan. 14—Joseph Caillaux, former prime minister of France, arrested for treason.
- Jan. 16—Fuel administrator ordered industries closed five consecutive days and nine Mondays to save fuel and relieve railroad congestion.
- Jan. 19—Russian assembly dissolved by Lenine because of disagreement on peace; Prussian legislature reaffirms exclusive right of Emperor to make war and peace.
- Jan. 20—British vessels in Dardanelles destroyed German cruiser Breslau and drove Goeben ashore.
- Jan. 21—Economic condition in Austria leads to strong effort to end war.
- Jan. 23—One hundred and sixty thousand Turkish troops in Palestine desert.
- Jan. 25—Germany conditionally accepts four of President Wilson's war aims, rejecting ten.
- Jan. 26—Fires in ship yards in Newark and Baltimore cause loss of \$2,000,000.
- Jan. 28—Revolution in Finland assuming serious proportions.
- Jan. 29—Three-fourths of Germany's troops have been sent to the western front from Russia.
- Jan. 30—Italians resume offensive on the Asiago front and advance their lines.
- Jan. 31—Serious strike riots in Germany.

- Feb. 2—Major-General March appointed acting chief of staff of American army.
- Feb. 6—Banks of the United States take issue of \$3,000,000,000 treasury certificates; Tuscania sunk; carried 2,179 American troops; 171 lost.
- Feb. 8—Germany announces 3,000,000 men on the western front preparing for gigantic offensive.
- Feb. 9—Peace treaty between central powers and Ukraine signed.
- Feb. 10—Bolsheviki rule in Russia reported as becoming intolerable.
- Feb. 18—Regardless of peace negotiations, Germany resumes hostilities against Russia.
- Feb. 21—Bolsheviki government appeals to people to resist German invasion.
- Feb. 27—Japan proposes joint military operations in Siberia.
- March 1—Official report showed 36 per cent of Canada's 400,000 killed or wounded; killed number 40,000.
- March 3—Bolsheviki government signs peace at Brest-Litovsk; Russia loses Ukrainia, Esthonia, Livonia, Finland, the Aland islands and three Transcaucasian provinces.
- March 5—Preliminary peace treaty signed between Roumania and the central powers.
- March 6—American troops holding four and a half miles on battle front in France.
- March 7—Treaty of peace signed between Germany and Finland.
- March 9—Russian government transferred to Moscow.
- March 10—Secretary of War Baker reached France on tour of inspection.
- March 13—German troops occupy Odessa; driven out five days later.
- March 14—Allies notify Holland of intention to seize Dutch ships in allied ports.
- March 18—Premiers of the allies denounce "Germany's political crime against Russia."
- March 20—Holland's ships interned in allied ports seized.
- March 21—Germany's most stupendous offensive begun in France on 50-mile front.
- March 23—Paris bombarded from distance of 76 miles.
- March 25—Germans in swift advance reach Bapaume.
- March 28—Germans reach Montdidier; Pershing offers France the entire American forces in "the greatest battle in history."
- March 29—General Foch becomes supreme head of allied forces.
- March 30—Anti-conscription riots in city of Quebec; daylight saving law in America became effective.
- April 2—United States had loaned allies in first year of war \$5,160,600,000.
- April 3—Forty thousand German troops landed in Finland.
- April 4—German offensive renewed east of Amiens; allied lines hold firm.
- April 5—American army at end of first year of war totals more than 1,500,000 in uniform.
- April 9—German attack in west shifted north around Messines ridge.
- April 13—German troops occupy Helsingfors, Finland.
- April 15—Count Czernin, Austrian minister of foreign affairs, resigned.
- April 16—Germans capture Messines ridge; Bolo Pasha executed in France for treason.
- April 17—Baron Burian appointed minister of foreign affairs in Austria-Hungary.
- April 19—Italian army represented on French front; Lord Milner becomes British secretary of war.
- April 21—Germans slow up western offensive to reform their legions; Japan agrees to loan United States 514,000 tons of shipping.
- April 22—Ireland preparing for general strike as protest against conscription.
- April 23—British naval raid against submarine bases at Zeebrugge and Ostend.
- April 25—Germany demands heavy concessions from Holland; announced that United States expenditures average \$35,000,000 per day.
- April 26—Germans capture Mount Kemmel, southwest of Ypres.
- April 27—Germans and Austrians renew Italian offensive.
- May 4—Last day of third Liberty Loan. The \$3,000,000,000 asked for was oversubscribed; Germans resume offensive in Flanders, with success.
- May 7—British naval sortie against Germany's submarine base at Ostend.
- May 27—Second great German offensive of 1918 begun on a 48-mile front in the Aisne region.
- May 29—Germans had advanced ten miles over narrow area and taken twelve towns.
- May 30—Soissons captured by Germans; Rheims endangered again.
- June 1—Germans only forty-six miles from Paris, after gaining nine miles in one day.
- June 3—Five German submarines attack United States coast and sink eleven ships.
- June 5—United States marines fight on the Marne near Chateau Thierry.
- June 10—United States marines capture south end of Belleau Wood.
- June 22—Italians defeat Austrians on the Piave.
- July 18—General Foch launches allied offensive, with French, American, British, Italian and Belgian troops.
- July 21—Americans and French capture Chateau Thierry.
- Aug. 2—Soissons recaptured by Foch.
- Aug. 5—American troops landed at Archangel.
- Sept. 12—Americans launch successful attack in Saint Mihiel salient.
- Sept. 29—Allies cross Hindenburg line.
- Sept. 30—Bulgaria surrenders, after successful allied campaign in Balkans.
- Oct. 6—Germany asks President Wilson for armistice.
- Oct. 8—President Wilson refuses armistice.
- Oct. 9—Allies capture Cambrai.
- Oct. 19—President Wilson refuses Austrian peace plea and says Czecho-Slovak state must be considered.
- Oct. 23—President Wilson refuses latest German peace plea.

Oct. 27—German government asks President Wilson to state terms.
 Oct. 29—Austria opens direct negotiations with Secretary Lansing.
 Oct. 30—Italians inflict great defeat on Austria; capture 33,000; Austrians evacuating Italian territory.
 Oct. 31—Turkey surrenders; Austrians utterly routed by Italians; lose 50,000 Austrian envoys, under white flag, enter Italian lines.
 Nov. 3—Austria signs armistice amounting virtually to unconditional surrender.
 Nov. 4—Allied terms are sent to Germany.
 Nov. 7—Germany's envoys enter allied lines by arrangement.
 Nov. 9—Kaiser Wilhelm abdicates and crown prince renounces throne.
 Nov. 10—Former Kaiser Wilhelm and his eldest son, Friedrich Wilhelm, flee to Holland to escape widespread revolution throughout Germany.
 Nov. 11—Germany accepts armistice terms.

Some Interesting Figures. America's part in the World War is summarized in the following statement, given out by the chief of the statistical branch of the General Staff:

Total armed force, including army, navy and marine corps.....4,800,000
 Total men in the army.....4,000,000
 Men who went overseas2,086,000
 Men who fought in France.....1,390,000
 Total registered in draft.....24,234,021
 Total draft inductions.....2,810,296
 Cost of war to April 30, 1919, \$21,850,000,000.
 Battles fought by Americans, 13.
 American deaths from battle wounds, 50,327.
 American wounded, 205,690.
 Deaths from disease, 58,073.
 Total casualties in army, 322,182.

During the war 7,450,000 men were killed, the various belligerents suffering as follows:

Russia1,700,000
 Germany1,600,000
 France1,385,000
 Great Britain 900,000
 Austria 800,000
 Italy 300,000
 Turkey 250,000
 Serbia and Montenegro..... 125,000
 Belgium 102,000
 Rumania 100,000
 Bulgaria 100,000
 United States 48,900
 Greece 7,000
 Portugal 2,000

Peace Negotiations. The collapse of Germany as a military power was accompanied by a revolution, whereby the empire was abolished and a republic was established. Kaiser William and Crown Prince Frederick William fled to Holland, and on November 28 the emperor signed a formal document of abdication. Germany had thus fulfilled one of President Wilson's conditions, that the allies could not make peace with the

Hohenzollerns. The peace conference met in Paris in January, 1919, and German representatives signed the treaty in Versailles on June 28. For details of the conference and terms of the treaty, see VERSAILLES, TREATY OF.

Related Articles. Various phases of the war and details connected with the subject which could not be treated in the general article may be found in the special articles listed below. The reader is also referred to the historical sections of the articles on the various countries affected by the war.

CITIES

| | | |
|---------------|----------------|-------------|
| Aleppo | Constantinople | Paris |
| Amiens | Damascus | Petrograd |
| Antwerp | Fiume | Rheims |
| Arras | Jerusalem | Riga |
| Bagdad | Lemberg | Saloniki |
| Belgrade | Lens | Sofia |
| Berlin | Liege | Triest |
| Brest | Lille | Venice |
| Brest-Litovsk | London | Verdun |
| Brussels | Louvain | Vladivostok |
| Bucharest | Moscow | Warsaw |
| Budapest | Namur | Ypres |
| Calais | Ostend | |

RECONSTRUCTED NATIONS

| | |
|------------------------|-------------|
| Armenia | Hungary |
| Austria | Jugo-Slavia |
| Czecho-Slovak Republic | Poland |

STATESMEN AND RULERS

| | |
|---------------------|------------------------|
| Albert I | George, David Lloyd |
| Balfour, Arthur J. | Grey, Edward, Sir |
| Bernstorff, Count | Nicholas II |
| Charles I | Poincaré, Raymond |
| Clemenceau, Georges | Venizelos, Eleutherios |
| Constantine I | Victor Emmanuel III |
| Francis Joseph I | William II |
| George V | Wilson, Woodrow |

MILITARY AND NAVAL COMMANDERS

| | |
|----------------------|-----------------------|
| Beatty, David, Sir | Joffre, Joseph J. |
| Bullard, Robert L. | Kitchener, Horatio H. |
| Foch, Ferdinand | Liggett, Hunter |
| French, John, Sir | Moltke |
| Haig, Douglas, Sir | Pétain, Henri |
| Hindenburg, Paul von | Pershing, John J. |
| Jellicoe, John, Sir | Sims, William S. |

INSTRUMENTS OF WAR

| | |
|----------------|----------------|
| Cannon | Poison Gas |
| Explosives | Submarine |
| Flying Machine | Submarine Mine |
| Howitzer | Torpedo |
| Machine Gun | Torpedo Boat |

MISCELLANEOUS

| | |
|------------------|--------------------|
| Balance of Power | Livonia |
| Balkan Wars | Lithuania |
| Bolsheviki | Lusitania |
| Conscription | Mesopotamia |
| Courland | Nations, League of |
| Dardanelles | Palestine |
| Dobruja | Siberia |
| Esthonia | Triple Alliance |
| Gallipoli | Triple Entente |
| Kiao-chau | Ukraine |

WORMS, *wurmz*, a term loosely applied to many small, rather long, creeping animals, lacking feet entirely, or having very short ones, including such various forms as the earthworm, the grubs of certain insects and intestinal parasites. The zoölogist, however, confines the term to animals belonging to the branch known as Vermes, and accordingly he excludes the larvae of all insects. See VERMES.

WORMS, *wormz*, GERMANY, situated on the Rhine, twenty-six miles southeast of

Mainz and twenty miles northwest of Heidelberg. It is an old city and contains many objects which are of interest because of their antiquity. Among these is the cathedral, which dates from the twelfth century, the Paulus Kirche, of about the same date, and a synagogue, which is still older. On Luther Platz is a monument to Luther, and it was in this city that he appeared before the diet in 1521 and refused to retract his theses (see LUTHER, MARTIN). The industries include the manufacture of textiles, leather, machinery, chemicals and chicory. Population, about 46,000.

WORMWOOD, *wurm'wood*, a perennial herb native to Europe and parts of Asia, which has been introduced into the United States and Canada. The erect, hairy stem from two to four feet high, bears coarse gray leaves and small yellow flowers. From the plant is extracted a bitter oil, used in the manufacture of the French liquor called *absinthe*, and as an ingredient of various medicines. In Biblical and other literature the plant is a symbol of bitterness.

WORSTED, *woos'ted*, or *wur'sted*, a tightly-twisted woolen thread made from long-fibered wool. The name comes from Worsted, the English village where it was first made. The thread is used for knitting and for weaving cloth. See WOOL AND WOOLEN MANUFACTURE.

WOUNDS, *woondz*, injuries to any of the soft parts of the body, occasioned by external violence and attended by a greater or less amount of bleeding. Cuts, incisions, stabs and bruises are good illustrations of wounds.

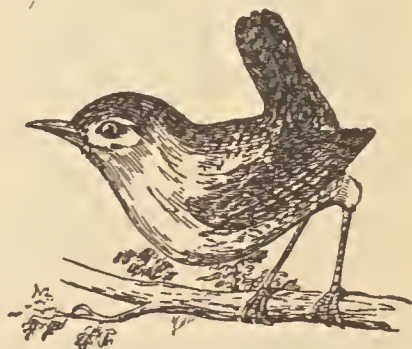
Poisoned wounds are those complicated with the introduction of some poison or venom into the part. If wounds are of such a nature that the edges can be brought together closely, and if then bacteria can be kept out, healing "by first intention" takes place rapidly and with little inflammation. When wounds are deep and open, they are slower in healing. Wounds poisoned by chemicals or by bacteria are likely to be serious, and sometimes an apparently trifling injury of this sort results in death.

The first step to be taken in the treatment of any of the wounds mentioned above is to stop the bleeding by binding tight the artery or vein which has been opened. Then thoroughly cleanse the wound with warm water, removing all foreign matter, and wash with some good antiseptic, such as boric acid

in saturated solution, a weak solution of carbolic acid, or with iodine. Finally, bandage the wound with perfectly clean gauze or light cloth. These bandages should be removed frequently, and the wound should again be cleaned, disinfected and redressed.

A fluid known as *Dakin's solution* was extensively used by French surgeons in the World War for irrigating wounds. It is a combination of chlorinated lime, sodium carbonate (dry) and sodium bicarbonate, and is an excellent antiseptic. See SURGERY.

WREN, a very active little bird, common in America, Europe and Asia. The wrens are distinguished by their small size, slender beaks, short rounded wings, brown or gray mottled plumage and erect tails. The common *house wren* of the United States builds its nest in boxes prepared for it, or crevices, wherever it can find them, seeming to have no fear of human beings and never hesitating to attack cats, dogs, swallows and other trespassers. The eggs are from three to nine in number and are white, dotted with salmon. The song of the wren is melodious and flute-like, and its amusing ways make it a great favorite everywhere.



WREN

It destroys large numbers of noxious insects; it is therefore a friend of the farmer and amply repays any care that may be taken of it. The largest wren in the United States is the *cactus wren* of the Southwest; the smallest is the *winter wren*, only four inches long.

WREN, CHRISTOPHER, Sir (1632-1723), one of the greatest of English architects, born in Knowle, Wiltshire. He was educated at Waldham College, Oxford, became a fellow of All Souls in 1653, was appointed professor of astronomy at Gresham College later, and afterward was elected Savilian professor of astronomy at Oxford.

There were few trained architects in England in his time, and as a scientist he was appointed one of the commissioners to restore Saint Paul's Cathedral. Before the work of restoration began the great London fire of 1666 occurred, destroying the building. Wren had been gradually drawn by consultations deeper and deeper into the problems of construction, and ultimately had become an enthusiastic student. Thus pre-

pared, the labor of building Saint Paul's devolved largely on him, and he was occupied with the work from 1675 to 1710. At the same time he made many designs for other public buildings, and in the forty years following the great conflagration there was not an important public building in London that was not designed by him.

Among the notable buildings he designed are the modern part of the palace at Hampton Court; the library of Trinity College, Cambridge, the hospitals of Chelsea and Greenwich; the Church of Saint Stephen's, Walbrook; those of Saint Mary-le-bow and Saint Michael, Cornhill; that of Saint Bride, Fleet Street, and the campanile of Christ Church, Oxford. In 1680 he was chosen president of the royal works, and from 1685 to 1700 he represented various boroughs in Parliament. Over the north doorway of Saint Paul's is a memorial tablet, on which are the well-known words, *Si monumentum requiris, circumspice* (If thou seek his monument, look about thee).

WRENCH, *rench*, a tool designed for gripping nuts, bolts, screws or pipes so that they may be turned. A simple wrench is that used by machinists, consisting of a flat metal bar with angular openings at end and sides. Another is an *alligator wrench*, made of a single piece of metal, at one end a handle, at the other a pair of jaws, with wedge-shaped opening, one side of which is toothed. The *monkey wrench* is more complicated. A bar of metal equipped with a wooden handle is fitted with a stationary jaw and a jaw which can be adjusted to various widths by means of a screw.

WRESTLING, *wres'ling*, a competitive sport engaged in by two persons, each of whom tries to throw the other prone upon the ground. Wrestling brings into play every muscle of the body, and when engaged in under the proper restraining rules is one of the most beneficial of sports. The winner in a wrestling match is usually the man who is the more skilful and alert; strength and weight count, but a quick eye and decision of action are even more essential.

Wrestling, being the most natural of sports, is among the oldest. In all Greek athletic contests it had a prominent part. The Greek wrestlers oiled their bodies, supposedly to make them more supple. Grace was insisted upon, and the most stringent rules were enforced. Roman wrestling was

of a rougher sort, in which participants were not infrequently killed. In the Graeco-Roman wrestling of modern France, the contestants are stripped to the waist and are not allowed to grasp each other anywhere below the belt or to trip each other. Most of the struggle takes place after both men are on the mat, and a fall is scored when one of the contestants forces both shoulders of his opponent to the ground.

The Irish method of wrestling is known as the *collar and elbow*. The wrestlers wear short jackets with stout collars and sleeves, to afford a good grip. Each man seizes the collar of the other with his right hand and the sleeves near the elbow with his left hand. If his grip loosens, he loses. A man is thrown when two shoulders and a hip or a shoulder and two hips touch the ground.

In England a good method of wrestling for boys and youths is known as the *black-hold catch*. Each contestant stands with his chin on the shoulder of the other, grasping the other about the body, the right arm of each under the left arm of the other. Tripping is allowed, but kicking or brutality is barred. The first step to certain success is to get the right shoulder beneath the armpit of the opponent. If a contestant loses his grip or if his shoulders touch the floor, he loses.

A freer method of wrestling, common in both England and America is the *catch-as-catch-can* method, in which, as the name implies, holds are taken at random. Tripping is permitted, but kicking and throttling are barred. Two shoulders on the floor constitutes a fall. When the match is professional, two falls in three or three in five are usually required for a decision. There are a number of recognized "holds" which give a wrestler great advantage over an opponent, such as the *grape-vine lock*, the *chancery*, the *half-Nelson* and the *hammer-lock*.

The Japanese have a system of wrestling known as *jujutsu*, which is a method of self-defense without the use of weapons. A master of jujutsu can, by a slight, swift movement, benumb an opponent's brain, dislocate his hip or shoulder or burst or twist a tendon. The police force of Japan are required to attain a certain proficiency in jujutsu, but the system in its entirety is taught to only a few men of the highest character and self-mastery. None is given the training without first taking oath not to reveal its secrets. See JUJUTSU.

WRIGHT, *rite*, CARROLL DAVISION (1840–1909), an American economist, statistician and legislator, born at Dunbarton, N. H. He received an academic education, and had been admitted to the bar when the Civil War broke out. He enlisted as a private and was promoted to a colonel's rank. After the war he was elected to the Massachusetts senate, and from 1873 to 1885 was chief of the state bureau of labor statistics. From 1885 to 1902 as United States Commissioner of Labor he was responsible for the publication of many valuable bulletins and studies on the labor problem.

In the latter year he became president of the college department of Clark University, Worcester, Mass. At various times he did important work for the government—in 1890 in connection with the census; in 1902 as a member of the anthracite coal commission—and lectured at Harvard, Johns Hopkins, Michigan and Northwestern universities. He was a member of many learned societies in America and abroad, and was honored by France with the Cross of the Legion of Honor. His books include *The Industrial Evolution of the United States*, *Outlines of Practical Sociology*, *Some Ethical Phases of the Labor Question* and *Battles of Labor*.

WRIGHT, HAROLD BELL (1872–), a popular American novelist, born in Rome, N. Y., and educated in the preparatory department of Hiram College, Ohio. He was at various times a painter and decorator, a landscape painter and a minister in the Disciples of Christ Church, and his first novel, *That Printer of Udell's* (1903), was written while he was preaching in Missouri. It was followed by *The Shepherd of the Hills*, a great popular success. In 1908 he retired from the ministry to devote himself entirely to writing, producing, in rapid succession, *The Calling of Dan Matthews*, *The Uncrowned King*, *The Winning of Barbara Worth*, *Their Yesterdays*, *The Eyes of the World* and *When a Man's a Man*. In 1920 appeared *The Re-Creation of Brian Kent*, in 1921 *Helen of the Old House*.

WRIGHT, ORVILLE (1871–), and WILBUR (1867–1912), two brothers who won undying fame as inventors of practical flying machines. Orville was born in Dayton, O., and Wilbur in Millville, Ind. Both were educated in the public schools. They began to study aeronautics in 1896. At this time they had a bicycle shop in Dayton, Ohio.

In 1900 they began experiments in aviation with machines of their own invention and manufacture, and three years later they had produced a machine which would remain in the air over a minute. In 1905 they made the first long-distance flight, near Dayton; and in 1908 Wilbur made his first public flight in France. After the brothers had won gold medals and homage in Europe they were recognized at home, and their machine was accepted by the United States government for use in the army. The Wright machines are now in use by every great nation. See **FLYING MACHINES**.

WRIT, in law, a formal order issued by a court in the name of a state enjoining the person mentioned therein to perform some specified act. It is issued under seal, attested by the proper officer and addressed to the sheriff or some other officer legally authorized to enforce its execution.

The following are the writs in most common use:

A writ of summons commands an authorized officer to notify a person to appear in court to answer to a complaint.

A writ of replevin is an order permitting the recovery of goods which have been illegally seized.

A writ of mandamus is a command to a person or corporation to something pertaining to his, or its, office or duty.

A writ of quo warranto is a command to show by what right an act is performed or an office held.

A writ of error is issued to remove an action to a higher court, by reason of error in the proceedings of the inferior court.

A writ of certiorari is issued by a court of review, requiring the record of a case to be sent up from an inferior court for examination.

For writ of subpoena see **Witness**. See, also, **Habeas Corpus**; **Injunction**; **Capias**.

WRITING, signs or characters inscribed on a surface for the purpose of recording and communicating thought. The earliest form of writing, practiced by all primitive peoples, was that of picture writing, or the copying of objects direct from nature. After this came symbolical writing, such as was developed in its highest form in the cuneiform system of Western Asia and the hieroglyphics of Egypt, in which abbreviated pictures were used as arbitrary symbols, first of things and later of sounds and words. These systems marked the transition from ideographic to phonetic writing, in which signs represent either syllables or single sounds.

Of systems of writing in which signs represent syllables, the most notable is the Chinese. As the same sound may have several meanings, it is often necessary to add to a syllable some sign to indicate which meaning is intended. The Phoenicians, basing their system on the Egyptian, are said to have invented the first phonetic alphabet, in which signs represent single sounds. Tradition has it that the Phoenician system was introduced into Greece by Cadmus of Boeotia, about the seventeenth century, B. C. The Greek forms spread to Sicily and Italy, being modified as they spread.

Various systems of writing differ in the arrangement of their symbols. Chinese characters are read in columns from top to bottom. Mexican picture writing is read from bottom to top. Hebrew writing, a modification of one form of the ancient Egyptian, is read from right to left. Sanskrit, Greek, Latin and all modern European languages are read from left to right. In medieval manuscripts a variety of styles were adopted in different epochs and countries.

Whole manuscripts were written in large or small capitals. Uncial letters, which prevailed from the seventh to the tenth century, were rounded capitals, with few hair strokes. Gothic characters, fanciful deviations from the Roman types, became common from the thirteenth to the fifteenth century. In England, in the early Middle Ages a variety of styles called Saxon prevailed; a mixed style was formed of a combination of Roman, Lombardic and Saxon characters; the Norman style came in with William the Conqueror, and the English court hand, an adaptation of Saxon, prevailed from the sixteenth century to the reign of George II.

There have been various unsuccessful attempts to introduce systems of phonetic writing, in which each sound should be reproduced by one invariable sign. Systems of shorthand are generally phonetic. See ALPHABET; HIEROGLYPHICS; SHORTHAND.

WRITS OF ASSISTANCE. In American colonial days the British customs officials were provided with general search warrants to aid them in collecting import duties. These warrants were called *writs of assistance*. These writs differed from an ordinary search warrant in that they did not limit the officer's search to a specified time or place, or to specified goods, but authorized him to seize any suspected goods.

The first writ of this kind was issued in 1761 and aroused much opposition. James Otis, advocate-general of the colony of Massachusetts, resigned his office and became leading attorney in a case in opposition to the issuance of the writs. In his appeal to the court he uttered radical sentiments in opposition to the king and Parliament. The writ was declared legal, but it was rarely, if ever, used. See WARRANT.

WRY'NECK, a European bird related to the woodpeckers, but, unlike the latter, unable to climb. It makes its nest in the natural cavities of trees, and lays from seven to



WRYNECK

twelve shiny, white eggs. It eats ants and other ground insects, which it captures with its bill or with its wormlike tongue. When disturbed, the bird thrusts its head out over its nest with an undulating movement, which has given it its name. Its habit of hissing on such occasions has earned for it the sobriquet *snake bird*.

WURTTENBERG, *vürt'em berK*, GERMANY, until 1918 a kingdom situated in the southern part of the former German Empire, bounded on the east and south by Bavaria and on the southwest and north by Baden. It has an area of 7,528 square miles, and a population of approximately two and a half million. In the Middle Ages, Württemberg was a county. In 1495 it was erected into a duchy and in 1806 became a kingdom. At the formation of the German Empire, in 1871, it became a part of that government. For surface, climate and products, see GERMANY.

WYANDOTTE, *wi' an dot*. See HURON.

WYANDOTTE CAVE, *wi' an dot*, a natural cavern in Crawford County, Ind., five miles northwest of Leavenworth. It is next to Mammoth Cave in size and has been ex-

plored for about twenty-three miles. It is noted for its large chambers, some of which are 200 feet high and 300 feet broad. The stalactite formations in this cave are of unusual magnitude and beauty. Those in the room known as the Pillared Palace are of unusual interest, while Monument Mountain is a group of stalagmite columns 175 feet high.

WYCLIFFE, or **WICLIF**, *wik'lif*, JOHN (about 1320-1384), an English reformer, born at Hipswell, in Yorkshire, England. Of his early life we know nothing. At sixteen he entered Oxford, became a fellow of Merton College, and later master of Balliol College and warden of Canterbury Hall. He zealously applied himself to the study of the Scriptures, which he subjected to the most critical analysis, and he early manifested a skepticism in regard to ecclesiastical doctrine and discipline.

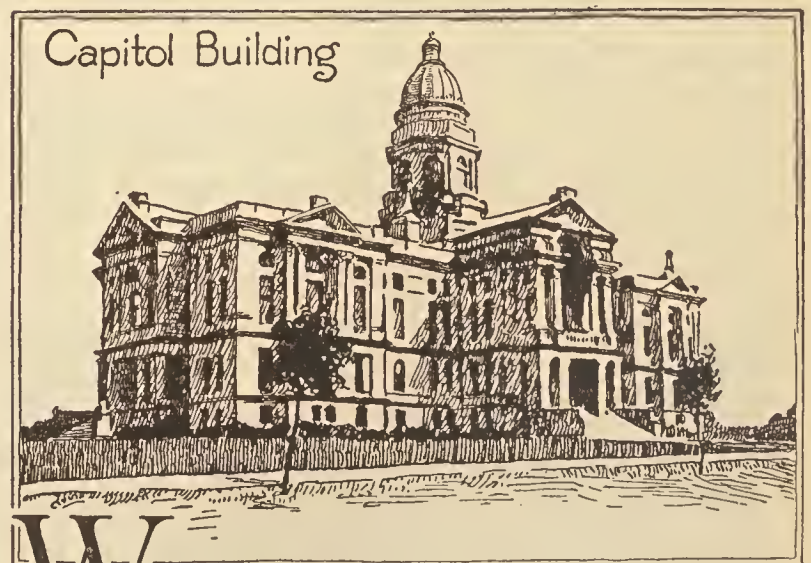
Disputes were going on at this period between Edward III and the Papal court, concerning tribute exacted from King John, and the English Parliament had resolved to support the sovereign in his refusal to submit to the vassalage. Wycliffe took a prominent part in this affair, urging King Edward to refuse the tribute to the Holy See. Pope Gregory XI, on learning of Wycliffe's defiant attitude toward the Church in regard to this matter, wrote letters to the king, to the archbishop of Canterbury and the University of Oxford, to have him tried for heresy.

In subsequent sermons, Wycliffe attacked the higher clergy, accusing them of having assumed undue power and unbecoming arrogance. In February, 1378, he appeared before Archbishop Courtenay in Canterbury Cathedral, attended by John of Gaunt and other friends. The people who were present became so angered against Wycliffe that he and his friends had to flee for their lives. He retained the favor of the king, however, and soon afterward was awarded a professorship of divinity in the University of Oxford. In 1380 he opposed the doctrine of transubstantiation at Oxford, and two years later he was summoned to appear before a commission of bishops and doctors at London. He refused to attend, availing himself of a university prerogative. The trial was conducted without his presence. Ten out of twenty-four articles culled from his writings were condemned as heretical, and fourteen were declared to be erroneous. By

an order from the crown, he was deprived of his professorship and expelled from the university. He returned to Lutterworth, in Leicestershire, where Edward had given him a rectory. Here he labored zealously and unweariedly. Part of his time was spent in translating the Bible from the Vulgate. He continued to write unceasingly and boldly against the papal claims, upholding the Scripture itself as the highest explanation of the divine law and urging the importance of teaching it to every Christian and hence the duty of giving it to the world in the common tongue of the people. He sent out young men with the Bible, to preach the plain, straightforward word of God. These men were known as *poor priests*, and the people heard them gladly.

On Dec. 28, 1384, while hearing mass, he was seized with paralysis and died a few days later.

Wycliffe's followers were active in spreading his teachings, which for about a generation after his death acted as a powerful religious and political factor among the English people. Before Wycliffe's time there had been no systematic attempt to translate the whole Bible into English, and hence the vast importance of the version known as Wycliffe's Bible. Aside from its value from a theological point of view, Wycliffe's Bible was an important contribution to English prose.



WYOMING, a northwestern state of the American Union, is located on the great Rocky Mountain plateau, and is rectangular in form, its boundaries being formed by meridians of longitude and parallels of latitude. It lies between Montana on the north and Colorado on the south, with South Dakota and Nebraska on the east and Idaho and Utah on the west. The name, meaning

large plains, was taken from that of the Wyoming valley in Pennsylvania. The southwest corner cuts into Utah. Yellowstone National Park, which with its adjoining forest reserve has an area of 5,000 square miles, occupies the northwestern corner, extending over the boundary into Idaho and Montana. The length of the state from east to west is 355 miles, the width from north to south is 276 miles, and the area 97,914 square miles. It is almost twice as large as New York and a little larger than Oregon, ranking eighth among the states.

The People. In 1920 Wyoming had a population of 194,402; in 1910, according to Federal census of that year, it was only 145,965. About one-sixth of the inhabitants are foreigners; Austrians, Canadians, English, Germans, Greeks, Italians, Scotch and Swedes are the most numerous. There are about 1,000 Chinese and Japanese, most of whom are employed as laborers in the mines. The Indian reservation within the state covers an area of 960 square miles, and the Indian population is about 1,900. Nevada is the only state having a smaller population.

Surface and Drainage. The surface of the state, for the most part, is composed of mountains and plateaus. The great plains of the Mississippi valley slope away from the foothills in the east. The elevation varies from 3,500 to 14,000 feet. The main axis of the Rocky Mountains, which forms the Continental Divide, extends from north to south across the state. The northern group of these mountains finds here its greatest development and is noted for its wild and rugged character and for its picturesque scenery. Yellowstone National Park, 3,600 square miles in area, occupies the northwestern corner of the state. In the west central part are the Wind River Mountains; in the north central part, the Big Horn Mountains, and in the extreme northeast, the Black Hills, extending into South Dakota; in the southeast is the Laramie range; in the south, the Medicine Bow Mountains, and in the west the Teton, Gros Ventre and Shoshone ranges. The southwestern portion of the state slopes towards the Pacific Ocean and forms a part of the Grand River Valley. From the eastern and western slopes of the Rocky Mountains, several rivers take their rise, among them the North Platte, the Green, the Snake, the Laramie and the Shoshone.

Climate. Wyoming has the typical climate of the mountainous region of the northwest. The air is pure and dry, clear weather prevails and the high altitude is for many healthful. The average annual temperature is 45.5°; the mean annual rainfall, 12.98 inches.

Mineral Resources. In every mountain range of Wyoming, gold, silver, lead and copper ores are to be found, but as yet the resources have not been largely developed. Coal mining is most important, the annual output being about 8,000,000 tons, and there are over 20,000 square miles of coal lands, from which a steadily-increasing tonnage is being mined. Valuable iron deposits are found in various localities in the state. Petroleum occurs in Fremont and Natrona counties, and its production is next to that of coal in importance; in 1922 this amounted to 26,200,000 barrels. Extensive phosphate beds are found in Uinta County. The state also possesses extensive deposits of soda and an abundance of valuable building stone. Gold, silver and copper are mined in paying quantities.

Agriculture. Below the timber line, the mountains are covered with forests of coniferous trees. Between the mountain ranges are broad plateaus, with arable soils, which by means of proper irrigation yield prolific crops. On account of the slight rainfall it has been supposed that only a small part of the state was capable of cultivation. However, modern methods of moisture conservation have brought vast areas under cultivation. Irrigation ditches also have been carried long distances from the source of water supply. The result has been an immense increase in the tillable area. The raising of livestock is the most important agricultural industry. The nutritive grasses which so abundantly cover the great ranges of the pasturage support many thousands of cattle and sheep. Oats, potatoes, wheat and hay are the principal crops.

Irrigation is being largely extended. The Shoshone project, the greatest in the state, includes a remarkable dam, 328 feet high, across a narrow canyon. The dam is only 85 feet long at the bottom and 200 feet at the top. A smaller dam diverts the waters of the Shoshone River, through a tunnel 3¼ miles long, into a canal which for 40 miles passes only the upper edge of a broad and fertile valley containing 150,000 acres. Near

Douglas, in Converse County, and in Johnson and Sheridan counties there are large irrigated areas.

Manufactures. As Wyoming is an agricultural and mineral state and still in the first steps of material development, it has no distinctive manufacturing interests. The most important manufacturing industry is car construction and railway repair, and next in importance is the manufacture of lumber and timber products.

Transportation. The principal railroads are the Union Pacific, the Chicago, Burlington & Quincy and the Chicago & North Western. The total operative mileage is over 2,000.

Government. The legislature is composed of a senate of twenty-eight members and a lower house of fifty-six members, elected for two years. The sessions are biennial, and are limited to forty days. The executive department consists of a governor, a secretary of state, an auditor, a treasurer and a superintendent of public instruction, each elected for four years. The courts consist of a supreme court, consisting of a chief justice and two associates, and such inferior courts as the legislature may establish.

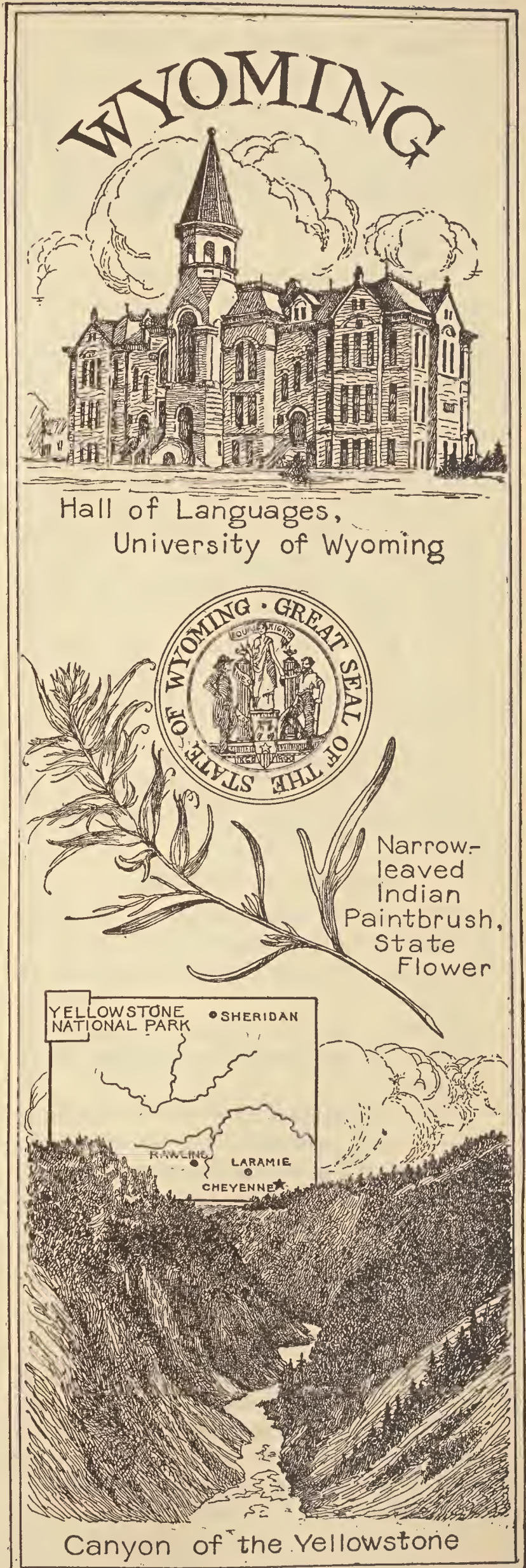
Education. The University of Wyoming, chartered in 1886, is situated at Laramie and is the leading educational institution. The expenses of the public school system are provided for in part by the rental of government lands which are set aside for school purposes. The total extent of lands which may be so used is 3,600,000 acres.

The state school system is in charge of a State Board of Education, with a commissioner, elected by the board, as the executive officer. There is a state superintendent of public instruction, who is a member of this board, but his relation is chiefly advisory.

Institutions. There is a soldiers' home at Buffalo, a hospital for the insane at Evanston, a school for defectives at Lander, an industrial institute at Worland and a state hospital at Rock Springs. The penitentiary is at Rawlins. At Thermopolis there is the Big Horn Hot Springs Reserve.

Cities. The chief cities are Cheyenne, the capital; Laramie and Sheridan. All are under 15,000 in population.

History. Wyoming was a part of the territory included in the Louisiana Purchase of 1803, with the exception of the southwest corner, which was a part of the territory ac-



Items of Interest on Wyoming

Wyoming is governed under a constitution adopted in 1889.

Amendments if agreed to by two-thirds of the members of each branch of the legislature are submitted to the electors of the state at the next general election.

About one-eighth of the land area is devoted to farms, but the improved land is only two per cent of the total area. Wyoming has over 30,900,000 acres of unreserved land.

There are two soda lakes in the state. In the summer the soda hardens and is cut into blocks three or four feet thick.

Wyoming's rivers are much frequented by anglers in search of rainbow trout. Specimens weighing from eight to ten pounds are found in the Big Laramie River.

The Yellowstone region is described in Washington Irving's *Captain Bonnevillie*, the hero being one of the early traders.

Wyoming abolished capital punishment in 1915. It has enacted workmen's compensation, child labor and mothers' pension laws.

Questions on Wyoming

What is the peculiar feature of the boundaries of Wyoming? Do the boundaries of any other state have a similar feature?

What does the name *Wyoming* mean? Is the name appropriate to the state?

What great river systems have tributaries in Wyoming?

What region within the state has a world-wide reputation because of its scenery?

What part of the state has the largest number of inhabitants? Why?

Locate the Indian reservations on the map. How many are there?

Why is Wyoming one of the leading wool-producing states?

What are the most important mineral productions?

Why is the mining industry not more fully developed?

Why are there not more railroads?

quired from Mexico in 1848. The first white man known to have visited the region was Sieur de la Verendrye, in 1734. He was seeking sites for fur-trading posts. White hunters visited the Yellowstone region in 1807, and from that time hunters began to traverse the territory.

The first permanent settlement was made at Fort Laramie in 1834. Most of the immigration to California and Oregon passed through the territory, but not until the completion of the Union Pacific Railroad in 1866 were settlers attracted to the country. The Indians were hostile, and long before the construction of the railroad the government had built a chain of forts for the protection of immigrants. The discovery of gold in 1867 increased the number of settlers, and in 1869 Wyoming became an organized territory. Yellowstone National Park (which see) was created in 1872. Wyoming was admitted into the Union as the forty-fourth state on July 10, 1890. From the organization of its first government the state has given women equal suffrage with men. From this practice it received its popular name, THE EQUALITY STATE.

Related Articles. Consult the following titles for additional information:

| | |
|-----------------|-------------------|
| Bighorn River | Sheridan |
| Black Hills | Snake River |
| Cheyenne | Yellowstone Na- |
| Laramie | tional Park |
| Rocky Mountains | Yellowstone River |

WYOMING, UNIVERSITY OF, a coeducational state institution, founded at Laramie in 1886. It comprises colleges of liberal arts, agriculture, engineering and education, departments of music, home economics, commerce and university extension, a teachers' training high school and a summer school. The Wyoming state normal school is maintained as a part of the college of education, and the agricultural experiment station is operated in connection with the agricultural departments. There is a faculty of about sixty, and a student enrollment of over 1,300. The library contains 40,000 volumes.

WYOMING VALLEY MAS'SACRE, a fearful massacre in Wyoming Valley, Pa., on July 3 and 4, 1778, perpetrated by an English and Indian force against the American settlers of the valley. A vast majority of the inhabitants, including women and children, were slain in the course of two days' slaughter, and the rest fled eastward to the nearest settlements. The valley was not settled again for several years.



X, the twenty-fourth letter of the alphabet and the representative of what might as well be denoted by *ks* or *gs*. The letter *x* was until a late date the last in the Roman alphabet, but *y* and *z* were finally added from the Greek. As an initial letter, it is pronounced like *z*, as in *Xenophon*.

In algebra, *x* is the usual symbol for the unknown quantity. In Roman numerals **X** signifies ten, perhaps from the fact that it represents a *V* standing upon a second *V* inverted.

XANTHIPPE, *zanthip'pe*, the scolding wife of the philosopher Socrates, whose forbearance with her quarrelsome temper was a salient trait in his character. The name has become proverbial as that of a scolding shrew.

XAVIER, *zav'e er*, FRANCISCO DE (1506-1552), better known as SAINT FRANCIS XAVIER, was a Jesuit missionary in Asiatic countries, earning the title "Apostle of the Indies." He was a native of Northern Spain, the son of a nobleman whose family seat was Xavier. He was sent to Paris to be educated, and with Loyola he founded the Society of Jesus. In the early part of 1540, he was chosen for the mission to India. From Goa, where he arrived in May, 1542, he extended his labors southward to Ceylon, Malacca and Celebes. He spent two years in Japan and returned to Goa to organize a mission to China, but before he could overcome the difficulties in his way, he died. Xavier was canonized in 1622.

XENIA, *ze'ne ah*, OHIO, the county seat of Greene County, fifty-five miles southwest of Columbus, on the Little Miami River and on the Cincinnati, Hamilton & Dayton, and the Pennsylvania railroads. The city is surrounded by a productive farming region. There are extensive cordage works, shoe factories, fuse and powder mills, machine shops

and automobile, rubber and candy factories. The Xenia Theological Seminary and the Ohio soldiers' and sailors' orphans' home are located here. A courthouse, a Carnegie Library and a Federal building are prominent features. Wilberforce University for colored students is located three miles north. There are interesting Indian mounds and relics in the vicinity. Xenia was settled in 1803, and was incorporated five years later. Population, 1910, 8,706; in 1920, 9,110, a gain of 5 per cent.

XENOPHON, *zen'o fon* (about 434—about 355 B. C.), an Athenian historian and general, a pupil of Socrates. When about forty years of age, he joined the expedition of Cyrus against Artaxerxes. Cyrus was killed in the Battle of Cunaxa, and the Greek generals were put to death. The ten thousand mercenaries then chose Xenophon as their leader, and he brought them out of the strange country to the Black Sea. On his return to Greece he fought with Sparta against Athens.

Xenophon wrote numerous works, and all of these, it would seem, have come down to us. The chief are a famous work called the *Anabasis*, which describes the expedition of Cyrus already referred to, especially the retreat of the Ten Thousand; the *Memorabilia*, a record of the life and teachings of Socrates; the *Hellenica*, which gives a somewhat dull account of forty-eight years of Greek history and is a continuation of the history of Thucydides, and several minor works. Xenophon's writings are clear and accurate, and are among the best sources of information regarding some of the most important events that have ever happened, but his style is often commonplace and monotonous.

XERXES, *zurk'zeez*, the name borne by three kings of Persia, the most celebrated of whom was Xerxes I.

Xerxes I, the son of Darius I, succeeded to the throne of Persia on his father's death, in 485 B. C. After suppressing a revolt in Egypt, he began to make plans for the invasion of Greece, the preparations for which had been begun by his father. These preparations were on the most enormous scale. Provisions were stored up on the intended route for three years, a transport fleet was collected, the engineering skill of the day was exerted to remove land obstacles and the resources of the vast Persian Empire were taxed to the utmost to produce an armament sufficient to crush Greece. According to ancient computation, the invading army numbered over two million, and although this, possibly, is an exaggeration, it must have been numerically the greatest army on record.

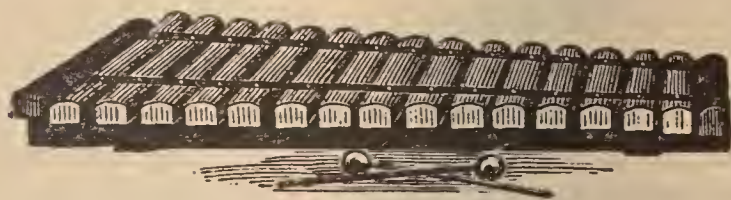
At the head of his enormous host, Xerxes advanced unopposed till he came to Thermopylae, but here his fleet was seriously damaged by a storm, while the narrow pass was effectually held by Leonidas, at the head of a determined, though small, band of Spartans. At last the passage was effected through treachery, and Xerxes marched on through Phocis and Boeotia to Athens, which he entered without opposition. In the meantime the Persian fleet had met with several mishaps. In two engagements with the Greek ships at Artemisium, it had suffered considerable damage, and a storm which occurred between the two conflicts was the cause of still greater loss. Finally, at Salamis (480 B. C.) a naval battle was fought, one of the most decisive in the history of the world, in which the Persians were defeated with terrible loss. Xerxes, who from a lofty eminence had watched the destruction of his fleet, fled panic-stricken to Sardis, leaving in command of his army, Mardonius, who was defeated the following year at Plataea. He spent the rest of his life in obscurity and was murdered by Artabanus, the commander of his bodyguard, who was plotting to make himself king of Persia. He was succeeded by his son Artaxerxes I.

Xerxes II was the son of Artaxerxes I. He was born about 450 B. C. and lived twenty-five years. On the assassination of his parents he ascended the throne but was murdered about a month later.

The third Persian ruler of this name, who was also called OARSES, ruled about 337 B. C.

X-RAY. See ROENTGEN RAYS.

XYLOPHONE, *z'lo fone*, a musical instrument. Small bars of wood, selected for



XYLOPHONE

their sounding quality, or pieces of metal of graduated length are fastened upon a horizontal frame in such a manner as to form the chromatic scale. The performer plays with two small mallets, one in each hand.

X Y Z CORRESPONDENCE, the name given to the dispatches sent in 1797-1798 to the United States government by its commissioners, Charles Pinckney, John Marshall and Elbridge Gerry, in Paris. These men were sent to France to settle certain difficulties with that government. On their arrival they were not received officially, but were compelled to communicate with the government through three agents, who informed them that the first step toward negotiation would be the payment of a large sum of money to the Directory, which was then in control of French affairs. The American commissioners, with the exception of Gerry, promptly withdrew and transmitted the correspondence to President Adams, who, in turn, laid it before Congress, substituting for the names of the French commissioners the letters X Y Z. The correspondence aroused the bitterest feeling in the United States, and a naval war with France was actually begun, but the French government receded from its position and thus averted a struggle. See ADAMS, JOHN.



Y, the twenty-fifth letter of the English alphabet, resembling in its form the Greek upsilon. It is, like *w*, both a consonant and a vowel, but it differs from *w* in that it is often used by itself as a vowel, as in *by*, *deny*, *pony*. In this use it is superfluous, as it might be replaced by *i*.

In algebra, *y* stands for the second of the unknown quantities.

YABLONOI, *yah blo noi'*, **MOUNTAINS**, a Siberian range extending from Northern Mongolia in a northeasterly direction about 1,000 miles and merging with the Stanovoi. The highest peaks, at the southern end of the range, attain an altitude of more than 8,000 feet. Many other peaks are 6,000 feet high.

YACHT, *yot*, **AND YACHTING**, *yot' ing*. A sailing boat, used for pleasure, for traveling or for racing, is known as a yacht. There are three principal rigs for sailing yachts—cutter, schooner and yawl. A *cutter* has one mast and a running bowsprit and usually carries four sails, namely, mainsail, gaff-topsail, foresail and jib. A square sail is also frequently set by the larger vessels of this class. A *schooner* has two masts, mainmast and foremast, a standing bowsprit and jib-boom, or not infrequently, instead of these, a running bowsprit, like that of a cutter. A *yawl* is rigged exactly like a cutter, with the addition of a small mizzenmast. It is a very convenient cruising rig and is becoming common for yachts of over 50 tons. Steam yachts are common, and in many localities they are put to practical uses by their owners. The speed attained by some is remarkable.

The history of yachting is the history of yacht racing, inasmuch as competition improved yachts, just as horse racing improved the breed of horses. Very arbitrary rules obtain with reference to the building of yachts for racing purposes. The first international contest between the United States

and England took place in 1851, when the *America* defeated fifteen English yachts in their own waters, and won the \$500 cup offered by the Royal Yacht Squadron. The trophy has remained ever since in the possession of the New York Yacht Club, though several English yachts have tried to win it back. In 1870 the *Cambria* was defeated. In 1885 the *Genesta* was defeated by the *Puritan*, and a year later the *Galatea* by the *Mayflower*. The *Volunteer*, the *Defender*, the *Reliance* are yachts that have more recently been successful in keeping the cup still in American hands.

The principal competitors have been vessels constructed for the purpose by Sir Thomas Lipton and named the *Shamrock* I, II and III. The races are usually sailed off Sandy Hook. In 1914 Sir Thomas sent the *Shamrock* IV to America for a race, but the outbreak of the World War prevented the contest. During the war most of the better yachts in America were loaned to the government for coast-patrol service. See SAIL-BOAT AND SAILING.

YAK, an animal of the ox tribe, found only in Tibet, Asia. It is found wild and is the ordinary domestic animal of the inhabitants of that region, supplying milk, food and raiment, as well as serving as a beast of burden. The size is that of a small ox. The horns are long, nearly cylindrical, smooth and pointed at the ends, and they have a peculiar and characteristic curve. Some of the domestic yaks are hornless. Their most remarkable external characteristic is the excessive growth and peculiar distribution of the hair.

The upper parts of the body and sides are clothed with thick, soft, woolly hair, more fully developed along the middle of the back, especially on the shoulders, where it forms a great bunch. From the upper parts of the

limbs and the whole of the lower surface of the body hangs a thick growth of long, straight hair, in old animals sweeping the ground and almost concealing the somewhat short legs. The tail is profusely covered with a thick mass of such hairs. The wild animals are nearly uniformly black; the domestic yaks are often quite white. The silky and tough hair and the skins are often used in the manufacture of caps, coats, blankets and ropes.

YAKIMA, *yak'he mah*, an Indian tribe, formerly living on both sides of the Columbia River and on the northerly branches of the Yakima in Washington. They were mentioned by Lewis and Clark in 1806. In 1855 the United States made a treaty with the Yakima and thirteen other tribes whereby they were required to cede valuable lands to the government and confine themselves to the Yakima reservation. The Indians resorted to war, and it was not till 1859 that the provisions of the treaty could be carried out.

YAKIMA, WASH., the county seat of Yakima County, is on the Yakima River and the Northern Pacific Railroad, the Oregon-Washington Railroad & Navigation Company line and an interurban road, and is about 200 miles southwest of Spokane. It is a distributing center for a large surrounding territory. It has extensive fruit canneries, flour mills, sawmills, other wood-working factories and warehouses. There is a fine Federal building, a Carnegie Library and a hospital. The commission form of government was adopted in 1912. The name was changed from North Yakima in 1917. Population, 1910, 14,082; in 1920, 18,539.

YALE UNIVERSITY, a foremost American institution of higher learning, and the third in point of age, as its establishment followed the founding of Harvard and of William and Mary. It is located in New Haven, Conn., and is the outgrowth of a small college founded in 1701 at Saybrook by ten ministers of the colony of Connecticut. In 1716 it was removed to New Haven, where it was permanently located, and two years later it was given the name of Yale College in honor of Elihu Yale, who bestowed upon it a sum of money.

The beginning of the present organization dates from the administration of Timothy Dwight, who was president from 1795 to 1817. During this time, permanent professorships were established, the college grounds were

extended and professional schools were planned, but only the medical school was established. President Dwight's successors continued his plan and the other professional schools were organized as rapidly as funds could be provided for their maintenance. In 1887 the state legislature authorized the adoption of the name Yale University.

As now organized, Yale has nine departments of instruction, each under the supervision of a special faculty. They are the College, which confers the degree of Bachelor of Arts; the Sheffield Scientific School, giving both graduate and undergraduate courses; the Graduate School, conferring the degrees of Ph. D. and M. A.; the Medical School; the School of Religion (undenominational); the School of Law; the School of Fine Arts; the School of Music; and the School of Forestry, a graduate department giving the degree of Master of Forestry. At Keene, N. H., there is a school forest of 1,000 acres.

The university is not coeducational, and it lost heavily because of enlistments after America entered the World War. Ordinarily there are about 4,000 students and over 700 instructors. There are about 1,250,000 volumes in the libraries. Among the notable structures are the observatory buildings, the gymnasium, and the Yale "Bowl," one of the largest football amphitheaters in the world. Many eminent men are among the alumni of Yale, including Nathan Hale, Jonathan Edwards, Lyman Beecher, James Kent, John C. Calhoun, Eli Whitney, Samuel F. B. Morse, Noah Webster and William H. Taft.

Elihu Yale (1648-1721), an English merchant and philanthropist, was born near Boston. His father was one of the original settlers of New Haven, Conn. The son was educated in England and began his career as a merchant, engaging in trade in India. From 1687 to 1692 he was governor of the East India Company's fort at Madras. He then returned to England. Mr. Yale became interested in the schools founded at Saybrook and afterwards located at New Haven, Connecticut. During his life he made several bequests to this institution, and in 1718 he announced a large gift. The trustees then honored him by naming the school Yale College.

YALU, *yah loo'*, **RIVER**, a river of Eastern Asia, which rises on the eastern borders of China and flows southwestward and south-

ward, forming during its entire course a part of the boundary between China and Chosen (Korea). Its length is about 300 miles, and it is navigable for about thirty miles. At the mouth of this river a famous naval battle was fought in 1894, during which the Japanese destroyed the Chinese fleet. The forcing of the passage of this river at its mouth by the Japanese in 1904 was the first movement in the land operations of the Russo-Japanese War. Since the Japanese annexed Chosen they have called the river *ORYOKU* (*o ri o'ku*). See *RUSO-JAPANESE WAR*.

YAM, a plant having edible roots much like the sweet potato. It is found in the temperate and subtropical parts of America, in China



YAM

and in the islands of the Southern Pacific. In Australia and China a species known as *winged yam* produces edible tubers from one and a half to three feet long which sometimes weigh thirty pounds. The skin is dark brown and the reddish flesh is sweet and juicy and very palatable when baked. A large yam is also found in India, though there the small white yam is more in demand for food.

The yam has become an important vegetable in the United States. While it contains less starch than the Irish potato, it contains more nitrogen and a high percentage of sugar.

YANCEY, *yan'sy*, WILLIAM LOWNDES (1814–1863), an American publicist and orator, born in Georgia. He studied law, was admitted to the bar in 1834 and practiced law, at the same time editing a Unionist paper. He removed to Alabama in 1836, became prominent as a lawyer and Whig orator and entered the legislature. Elected to Congress in 1844, he espoused the Southern cause, and after his retirement two years later he became the recognized leader and orator of the radical element in the South.

In the convention which met at Montgomery, Ala., January 7, 1861, he reported the ordinance of secession. He went as a Confederate commissioner to seek European recognition of the independence of the Confederacy, but was unsuccessful. After his return he served in the Confederate Senate until his death. Yancey, though he held office for only two brief periods, was one of the most influential orators of the Civil-War period and did perhaps more than any other man to strengthen among Southerners the desire for secession.

YANG-TSE-KIANG, *yahng' tse kyahng'*, one of the largest rivers of Asia. It rises in the south-central part of the continent, in the plateau of Tibet, flows northeastward, then southeastward, then northeastward; after an irregular course, it enters the Yellow Sea through an estuary about thirty miles wide. Its length is about 3,000 miles. The upper part of the course is between mountains, and the channel is narrow and the stream rapid, often interrupted by rapids and falls. The tide ascends the river for 450 miles, and it is navigable for 600 miles.

The chief tributaries are the Han, from the north, and the Wu, the Heng and the Kan, from the south. Some of these are navigable for considerable distances. The Yang-tse-Kiang brings down large quantities of sediment, and it is estimated that the amount deposited each year is equal to about five-sixths of the amount deposited by the Mississippi. It is connected with the Hoang-ho by the Grand Canal, and it is one of the most important waterways in the Chinese Empire.

YANK'EE, in America, the popular name for a New Englander; in Great Britain it is often applied indiscriminately to the whole population of the United States, and during the World War it was the common designation of the American soldier, regardless of his state. In its origin it was a corruption of the

word *English* as pronounced by the Indians. It seems to have been first applied about 1775 by the British soldiers as a term of reproach to the New Englanders, who themselves afterward adopted it. Since the Civil War the Southern people have applied it to all people of the North.

YANKEE DOODLE, a national song of the United States, sung to a very old tune, which dates from the tenth century. The words, which are mere doggerel, were probably written at the time of the French and Indian War by an English army surgeon, Dr. Richard Schuckburgh, in derision of the ill-trained continental troops. Notwithstanding its mockery, it was taken up by the "Yankee" soldiers and became widely popular.

YANK'TON, S. D., the county seat of Yankton County, sixty-five miles southwest of Sioux Falls, on the Missouri River and on the Great Northern, the Chicago, & North Western and the Chicago, Milwaukee & Saint Paul railroads. The city is the center of a large agricultural and stock-raising district. Its manufactures include flour, cement, bricks and cigars. There are two nurseries. The Yankton College (Congregational) is located here; also the state hospital for the insane. Other notable institutions and buildings are the Sacred Heart Hospital, a Federal building and a Carnegie Library.

Yankton is the oldest settled community in the Dakotas. It was settled in 1858 and was the capital of Dakota Territory until 1883. It adopted the commission form of government in 1910. Population, 1910, 3,787; in 1920, 5,024, a gain of 33 per cent.

YAQUI, *yah'ke*, **INDIANS**, a native tribe of the Mexican state of Sonora, numbering about 20,000 and representing a well-developed type of civilization. They are said to be the only Indian tribe that has never been fully subdued by the white man. They made a treaty with the Spaniards in 1610, but their history from 1740 down to the present has been a series of revolts. In 1906 the Mexican government took the extreme measure of attempting to subdue them by deportation to Yucatan. The industries of the Yaquis are agriculture, cattle raising and the manufacture of cotton and woolen stuffs. They also make hats of palm leaves and baskets of reed. Many are employed as laborers in fields and mines.

YARKAND, *yahr kahnd'*, a city situated in the chief oasis of Chinese Turkestan, 100

miles southeast of Kashgar. It is at an elevation of over 3,800 feet, is enclosed by a wall and surrounded by a moat. The buildings are constructed of stone and clay, and most of them are of one story. The city has numerous bazaars, mosques and caravansaries. It is also the seat of some Mohammedan colleges. It is surrounded by an agricultural and stock-raising region and carries on a trade in silk, dyes, leather, wool, tea and sugar. Yarkand is not so important a commercial center as formerly, owing to the fact that railway lines elsewhere have diverted much of its caravan trade. Population, about 70,000.

YARMOUTH, *yahr'muth*, NOVA SCOTIA, the county seat of Yarmouth County and an important seaport, situated on a small bay of the Atlantic Ocean, 205 miles southwest of Halifax. It is the eastern terminus of the Canadian Pacific and the Canadian National railways, and has steamship connection with Boston, Halifax and Saint John. Its commercial prestige is due largely to its fisheries and fish preserving industries and its lumber trade. It has also a woodworking factory, a steel shipbuilding and boiler plant, a shoe factory and a cotton mill for the manufacture of duck and sailcloth. Yarmouth was founded in 1861, and was incorporated as a town in 1890. It is a city of beautiful homes, fine streets and attractive surroundings. Population, 1911, 6,600; in 1921 it increased to 7,062.

YARMOUTH, or **GREAT YARMOUTH**, ENGLAND, a seaport and watering place situated on the east coast, nineteen miles east of Norwich. The town occupies a narrow peninsula between the Yare River and the North Sea, and is connected by bridges with Suffolk and other places on the right bank of the Yare. The river is lined with extensive piers. Yarmouth is an important commercial port, and is the chief center of the herring fisheries of England. Other industries include shipbuilding and the manufacture of ropes, nets and sails. Dickens has described the salty, fishy air of Yarmouth and the charm of its seafaring folk in his novel, *David Copperfield*. Population, about 60,000.

YARN, thread made by twisting the fiber of wool, cotton, flax, silk, hemp or other materials. The yarns are woven into fabrics, or used in knitting, embroidering and sewing. For the process of making yarn, see SPINNING.

YATES, RICHARD (1818–1873), an American political leader, born in Warsaw, Ky., but taken in childhood to Springfield, Ill. He graduated at Illinois College, Jacksonville, and began the practice of law at Springfield, where he became a prominent Whig. He was elected to the state legislature, serving from 1842 to 1849, and he was a member of Congress from 1851 to 1855. He became a Republican at the organization of the party and was elected governor of Illinois in 1860. During five years' service, he gained fame as one of the greatest of the war governors and was a close friend and adviser of President Lincoln. In 1865 he was elected to the United States Senate, where he served one term. His son, Richard Yates (born 1860), was governor of Illinois from 1901 to 1905, and in 1918 was elected a member of Congress from Illinois.

YAZ'OO, a river of Mississippi, formed by the junction of the Tallahatchie and the Yalabusha. It has a winding course to the south and southwest and enters the Mississippi about five miles above Vicksburg. Its length is 300 miles, and it is navigable for steamboats throughout its course. The name is an Indian word meaning *river of death*.

YEAR, the period of time during which the earth makes one complete revolution in its orbit, or the period which elapses between the sun's leaving either equinoctial point, or either tropic, and its return to the same. This is the *tropical*, or *solar*, year, which is the year in the strict and proper sense of the word. This period comprehends what are called the twelve calendar months, and it is usually considered to commence on January 1, and to end on December 31. It is not quite uniform, but its mean length is 365 days, 5 hours, 48 minutes and 46 seconds. In popular usage, however, the year consists of 365 days, and every fourth year of 366. The extra day is always added to February, and the fourth year is called *leap year*. The *sidereal* year consisting of 365 days, 6 hours, 9 minutes and 9 seconds, is that used in astronomical calculations.

Related Articles. Consult the following titles for additional information:

| | |
|-----------|---------------|
| Calendar | Precession of |
| Equinox | the Equinoxes |
| Leap Year | Seasons |

YEAST, *yeest*, the ferment used in bread-making and in brewing, composed of a mass of small one-celled yeast plants. These cells are so small that 3,000 of them, laid end to

end, would scarcely measure an inch. Under favorable conditions they multiply very rapidly, breaking up the sugar in the substance upon which they feed, setting free carbonic acid gas and forming alcohol. Yeast manufactured for commercial purposes may be liquid, dry or compressed in form.

Related Articles. Consult the following titles for additional information:

| | |
|---------|--------------|
| Bread | Fermentation |
| Brewing | |

YEATS, *yeets*, **WILLIAM BUTLER** (1865–), an Irish poet and dramatist, born in Dublin, the son of a distinguished artist. At an early age he turned his attention to literature, and became a leading figure in the Irish literary revival. With Lady Gregory he helped to establish the Irish Literary Theater, from which the Irish National Theater Society developed. He made lecture tours in the United States and Canada in 1903 and 1914. Yeats' peculiar gifts as a dramatist are conspicuous in *Cathleen ni Hoolihan*, *The Pot of Broth*, *The Hour Glass*, *Deirdre* and *The Land of Heart's Desire*. His verse is of the highest lyrical quality, and possesses the same sort of elusive charm that is found in his essays and plays.

YED'DO, JAPAN. See TOKYO.

YELLOW, one of the three primary colors. Lemon and canary yellow may be taken as pure yellows. Chrome yellow has a slight orange tint. A peculiarity of yellow is that an increase of light seems to strengthen the color; and that the color is also greatly intensified when placed beside its complementary color, blue. Moreover, it reciprocally intensifies the blue. Yellow is the national color of China.

YEL'LOWBIRD. See AMERICAN GOLD-FINCH.

YELLOW FEVER, an infectious and highly fatal disease of the warm regions of America and Africa, communicated to the human system by the bite of a species of house mosquito. The disease was first recognized in 1647 in the West Indies. In 1691 there was a disastrous epidemic of it in Barbados. In 1878 a severe visitation of the disease in the lower Mississippi valley killed about five thousand persons in New Orleans and Memphis alone. Since the occupation of Cuba and the Canal Zone by the United States, the disease has been practically stamped out in those regions. Proper sewerage, disposal of garbage, isolation of patients and their protection by screens from mosquito bites, dis-

infection of buildings in which cases occur and the destruction of the breeding places of the mosquitoes themselves have proved effective methods of combating the disease.

Yellow fever is so called because the skin of its victims takes on a yellow hue owing to jaundice which spreads over the whole of the body. The onset of the disease takes place three or four days after infection, and is usually characterized by severe chills or rigors. Temperature rises rapidly, and may reach 105° or even higher. In favorable cases the fever abates at the end of the fourth day, and with rest and careful feeding recovery may be complete in two or three weeks. In severe cases blood may be discharged from the bowels and there may be bleeding of the nose or gums. Delirium sets in, and the patient lapses into unconsciousness. Death is due to hemorrhage, heart depression, suppression of the urine or the direct action of poisons upon the vital centers. See MOSQUITO.

YEL'LOW-HAMMER, one of the numerous names of the American golden-winged woodpecker, or flicker. In England the name is applied to the yellow bunting. This bird is bright yellow, with patches of brown. The wings are black, bordered with gold. The bird builds in hedge-rows; the eggs are spotted with red. See FLICKER.

YELLOW JACKET, the common name for any wasp whose body is marked with yellow. See WASP.

YEL'LOWLEGS, an American snipe found in marshes and along shores. It is black and white on head, breast and back, and light underneath. It nests in Canada as far north as the Arctic Circle, laying three or four buff-colored eggs in a depression of the ground. In winter the birds migrate as far south as Argentina, traveling a distance of eight thousand miles twice yearly—the longest migratory flight made by any bird.

YELLOW RACE. See MONGOLIAN RACE.

YELLOW SEA, an arm of the Pacific Ocean, invading the continent of Asia 600 miles, between China and Chosen (Korea). It is connected with the Japan Sea by the Chosen Strait. Its greatest width is 300 miles; its greatest depth, 300 feet. The northern projections form the Chosen, Liao-tung and Pe-chi-li gulfs. Of the rivers flowing into it the largest are the Hoang-ho, the Liao and the Yalu, the latter now known as the Oryoku. The large quantities of yellow mud

deposited in it by inflowing streams have given this sea its color and its name.



Y**ELLOWSTONE NATIONAL PARK**, America's most celebrated wonderland, containing the greatest geyser region in the world, is situated in the northwestern corner of Wyoming, extending over the western and northern boundaries a distance into Idaho and Montana. The park was set apart in 1872 for "the benefit and enjoyment of all the people," and it was the first region thus dedicated by the government. It has a length from north to south of sixty-two miles and a width from east to west of sixty-four miles, and its area of 3,300 square miles makes it about two-thirds the size of Connecticut. On the north and west it includes narrow strips of land from Montana and Idaho, respectively. In 1891 a forest reserve, lying to the south and east of the park, was created by Presidential proclamation and placed under the control of the park authorities. The total area of the two reservations is about 5,500 square miles.

Surface. The central portion of the park consists of a broad plateau, ranging in altitude from 7,000 to 8,500 feet. This plateau is bordered by a number of mountain ranges, in which peaks rise to a height of 11,000 to 12,000 feet. Of these the most important ranges are Absarokas, on the east; the Snowy Mountains, on the northeast; the Gallatin Range, on the north and west, and the Tetons, on the south. The loftiest mountain in the park is Electric Peak, which has an altitude of 11,155 feet. The highest land in the vicinity is Mount Hayden, more commonly known as the Grand Teton, the highest peak of the Teton Range, having an altitude of 13,671 feet. This stands on the south of the park, just a few miles beyond the boundary.

The mountains are separated from one another by broad plateaus or valleys, and the intermingling of these features gives a diversity to the scenery which is remarkably pleasing. The great valleys are Junction Valley, on the east, which, with its branches, includes the Yellowstone and the Lamar rivers; Hayden Valley, occupying an important tract along the Yellowstone River between Yellowstone Lake and the Great Fall;

the Madison Valley and its extensions, through which flow the Firehole and Gibbon rivers, and in which are located the geyser regions; Swan Lake Flats, Willow Park, the Shoshone and the Paul's River basins.

Rivers. The Yellowstone National Park is drained into three river systems, the Yellowstone, the Missouri and the Snake. The first two find an outlet on the Atlantic slope, while the third reaches the Pacific. The rivers flowing into the Missouri are the Madison, formed by the Gibbon and the Firehole, and the Gallatin. These drain the northwest and west central portions of the park. The southwestern and most of the south central portions are drained into the Snake River, and thence into the Columbia. The eastern and southeastern portions are drained into the Yellowstone, and thence into the Missouri. Between these river systems the Continental Divide passes in an irregular line, entering the park near the southeastern corner and extending in a general northwesterly direction, leaving the western boundary near its middle point. This divide is a plateau, varying in altitude from 7,000 to 8,500 feet. In the southeastern part of the park is the Two Ocean Plateau, so named because rivers having their source in it flow respectively to the Atlantic and to the Pacific. In one locality these rivers come so near each other that during high water streams flowing in both directions are fed from the same source.

Canyons. The rivers are characterized by their clear water, swift current, deep canyons and beautiful cascades. Among the minor canyons worthy of mention are the Golden Gate, the Canyon of the Gibbon and the Canyon of the Gardiner. But surpassing all of these in beauty and grandeur is the Grand Canyon of the Yellowstone, a gorge nearly twenty miles in length and in places over 1,400 feet deep. The upper part of this canyon, for about five miles, consists of bare rocks, noted for the variation and brightness of their coloring. Prominent, among the colors are red, terra cotta, yellow and gray. At the head of this gorge is the Great Fall of the Yellowstone, where the stream makes a perpendicular descent of 310 feet. While other canyons are larger, it is generally conceded by travelers that nowhere else in the world has there been found a natural gorge which, for beauty and grandeur combined, equals the Grand Canyon of the Yellowstone.

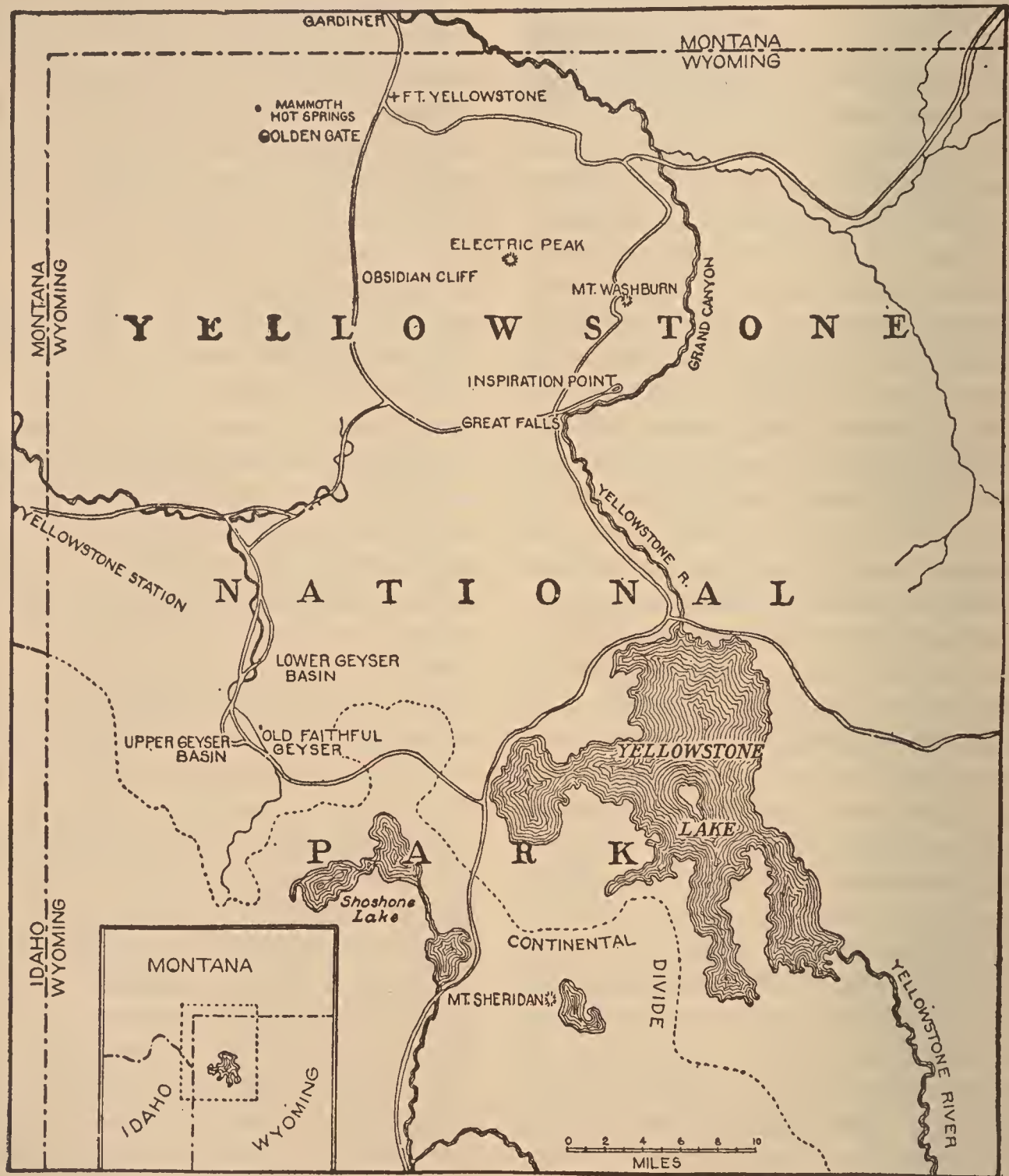
Falls. There are over thirty waterfalls in the park. Some of these are small cascades, scarcely worthy of notice, while others are cataracts seldom surpassed for their beauty and grandeur. Among the falls worthy of mention are Gibbon Falls, eighty feet in height; Firehole Falls, upon Firehole River, sixty feet; Kepler Cascade, eighty feet; the Osprey Falls, 150 feet; Tower Falls, 132 feet, and the Falls of the Yellowstone, the upper fall of 112 feet and the lower of 310 feet. The last are the largest and by far the grandest falls of the park.

Lakes. Foremost among the bodies of water in the park is Yellowstone Lake. This sheet of water has an altitude of 7,741 feet and is the largest body of fresh water in the country at so great an altitude. Its area is 139 square miles, its maximum depth, 300 feet, and its shore line about 100 miles. Its waters are cold and swarm with fish. On the shore of the western projection, known as The Thumb, is seen the peculiar proximity of hot and cold water for which this region is noted. Here are several hot springs, whose cones have been built up within the lake, so that they are surrounded by cold water, and one can easily catch fish from the lake and, without moving from his tracks, immerse them in a spring hot enough to cook them. Other lakes of importance are Shoshone, to the south and west of Yellowstone; Louis Lake, south of Shoshone, and Jackson Lake, just across the southern boundary.

Hot Springs. Within the boundaries of the park are found no fewer than 4,000 hot springs and 100 geysers, whose temperatures vary from 60° to 175°. Many of the springs boil and, to a casual observer, would appear to have the temperature of ordinary boiling water; however, much of the ebullition is due to the escape of gas. The most prominent of these springs are the Mammoth Hot Springs, situated about five miles from the Gardiner entrance and near Fort Yellowstone, which is the administrative headquarters. These springs are noted for the beautiful terraces which they have formed, covering in all an area of nearly 200 acres, and varying in altitude from a few feet to nearly 350 feet. These terraces have been formed by the overflow of the water, which is charged with limestone, that is, held in solution while the water is hot; as the water overflows and runs down the side of the crater it evaporates and deposits minute particles of the solidified

lime. Thus, as the years go by, the spring builds up its crater, raising the level of the water higher and higher and increasing the height and extent of the walls which enclose it. These terraces are objects of rare beauty, because of their great variety of coloring. Some are bright yellow; others of a terra cotta hue, while others are nearly white; many have a variety of colors. The water in the springs is remarkably clear, and be-

quiescent pools and are of interest because of the beauty of their coloring. The contrast in coloring is remarkable and is due entirely to the reflection of light from the crater of the spring, since in all cases the water taken from them is transparent. Among these springs of special note are the Turquoise Spring, in the Middle Geyser Basin; Prismatic Lake, a pool of hot water over 150 feet across, under ordinary conditions reflecting



YELLOWSTONE NATIONAL PARK

cause of the reflection from the crater it has a peculiar blue color, seen nowhere else.

Aside from the Mammoth Hot Springs, the smaller springs are quite generally distributed throughout the park, though they are the most numerous in three localities, where they intermingle with the geysers. These localities are the Norris Geyser Basin, the Lower Geyser Basin and the Upper Geyser Basin. Most of the hot springs are merely

all the tints of the rainbow; the Morning Glory Spring, Emerald Pool; Sapphire Pool, and the Punch Bowl, so named because of the form of its crater.

Geysers. There are two classes of geysers—the geysers proper and those known as fountains, which are distinguished by an eruption in which all of the water in the crater is thrown out in the form of a great fountain, leaving the crater empty. The

eruption of a fountain geyser lasts but a few moments; and will not be repeated until the crater is refilled. The most remarkable geysers of this type are the Fountain and the Great Fountain, both in the Lower Geyser Basin. Of the true geysers, Old Faithful, which has an eruption every seventy minutes and throws a jet of water varying from 75 to 125 feet high; the Beehive; the Giant; the Giantess; the Castle, and the Riverside are the most noted. The Giant, when in eruption, expels a column of water five feet in diameter to a height of nearly 250 feet and continues in operation for an hour and a half. The Giantess is even larger, but the eruptions are much less frequent. In general, the larger the geyser the longer the interval between periods of eruption. Most of the interesting geysers are found in the Upper Geyser Basin, where, within an area less than a mile square, nearly all of the large geysers are located. Interspersed among the large geysers are numerous small ones, some of which erupt every few minutes.

Other Objects of Interest. The greater part of the park is covered with beautiful forests of pine, through which the tourist passes on his way from one point of interest to another. The Park is a game preserve. Hunting is strictly prohibited, and the forests now abound in large game, including bears, elk and antelopes. There are also a few wild buffalo, and their number is increasing every year. The care taken of these animals has removed the timidity which generally characterizes them, and they are frequently seen by tourists, while the bears in many instances become very tame. In addition to the more striking features described above, there are many minor objects of interest, such as Obsidian Cliff, a mountain of volcanic glass from 250 to 300 feet in height; the Paint Pots, which are really hot springs, expelling colored clay from their craters, and mud geysers and volcanoes, differing from the other geysers in ejecting turbid water. Roaring Mountain is a hill several hundred feet high, from the openings in whose sides issue jets of steam with such force that they can be heard at quite a distance. In each of the hot spring regions are also found vents, known as *fumeroles*, through which steam escapes with a terrific force.

Tours through the Park. Yellowstone National Park belongs to the people, and

anyone can visit it and make a tour to suit his pleasure. He is bound only by such restrictions as are necessary to preserve the natural beauty of the region and to protect the wild animals. Guns are not allowed, and visitors cannot cut growing timber. If they make camp fires, they are required to see that such fires are carefully extinguished before they break camp. Marking or defacing the formations about the geysers in any way is strictly forbidden, and one transgressing in this respect is subject to heavy fine, if caught.

The roads through the park are not excelled anywhere in the country. Automobiles were admitted for the first time in 1915, and now they are used for all transportation. Large hotels, with an equipment equal to those in the largest cities, have been opened at Mammoth Hot Springs, the Upper Geyser Basin, at the Fountain and at the Canyon, and tourists who desire these accommodations can make a trip through the park as comfortably as they can travel the same number of miles in any other region in the world.

Transportation companies operating permanent camps provide equally enjoyable and less expensive accommodations, or parties may travel with their own outfit and set up their camps at their pleasure. However, after their store of provisions has been raided by bears two or three nights in succession, they will probably place themselves in care of one of the transportation companies. The park is entered by three gateways—Gardiner on the north, Cody on the east, and Yellowstone on the west. The Gardiner gateway is the most convenient, because it is on the boundary and nearest to the hot springs and geysers. The regular trip includes a ride of about 150 miles and should take five or six days.

YELLOWSTONE RIVER, a river of the United States, the largest tributary of the Missouri. It rises in Northwestern Wyoming, in the Continental Divide, flows north-east through Montana and into the Missouri a short distance beyond the boundary of North Dakota. Its length is about 1,100 miles. Throughout most of its course the river is followed by the Northern Pacific Railroad.

YE'MEN, a territory of Southwestern Arabia, bordering on the Red Sea. It embraces an area of about 73,800 square miles,

and is a region of mountains and plateaus, from 8,000 to 10,000 feet in altitude. The coast lands are arid, but the valleys are gardens of tropical vegetation. Excellent coffee is grown. The people, numbering about 750,000, are engaged chiefly in stock raising. There are no railroads, but there are several caravan routes from the interior to the coast. Hodeida is the principal port. At the close of the World War there was under way a movement to have Yemen included in a united Arabian state free from Turkish control. See ARABIA; TURKEY.

YEN, the monetary unit of Japan, equivalent to about fifty cents of United States money. The yen was formerly coined in both gold and silver, but in 1897 Japan adopted a gold standard, and since that time no single gold yens have been coined, but two-yen, five-yen, ten-yen and twenty-yen pieces are in common use. The smaller denomination in Japanese money is the sen, equivalent to a half cent. The 5-sen is coined in nickel; 10-sen, 20-sen and 50-sen pieces, in silver.

YENISEI, *yen e say'e*, a river of Asia, one of the longest in the world. From its sources in the Sayansky Mountains, in Northwestern Mongolia, it flows in a general northwesterly direction and enters the Arctic Ocean near the Gulf of Ob, through an estuary about 500 miles long. Above the estuary its length is 2,500 miles. An area of 1,000,000 square miles is drained by it. South of Krasnoyarsk, near which it is crossed by the Trans-Siberian Railway, it is ice-free half the year, and it is navigable to Minusinsk, at the mouth of the Angara River. With its navigable tributaries and canal connections the Yenisei is of the greatest commercial importance to Western Siberia.

YER'KES OBSER'VATORY, an astronomical observatory situated at Williams Bay, an arm of Lake Geneva, Wisconsin. It is owned by the University of Chicago, and was named in honor of Charles Tyson Yerkes, who donated the money for buildings and instruments. The refracting telescope of this observatory is the largest of its kind in the world, having a diameter of forty inches. See TELESCOPE.

YEW, *yu*, an evergreen tree of the pine family, with dense, spreading branches, thickly covered with very dark green linear leaves. The common yew of Europe is very long-lived, and in England it is planted in cemeteries and is considered an emblem of

immortality. The leaves and seeds are poisonous, but the red berries are not. The tough, elastic wood was used for making bows in the days before firearms were invented. The American yew is commonly known as *ground hemlock*, and is a low shrub, with straggling branches, common in dense forests.

YGGDRASIL, *ig'dra sil*, in Norse mythology, the enormous ash-tree which binds together heaven, earth and the underworld. It was the tree of life, fate, time and space.

YID'DISH, the dialect spoken by the Jews of Eastern Europe, used by more people than any other Hebrew form of speech. It represents a combination of various languages, notably Hebrew, German, Aramaic and Slavic, and has been carried to all parts of the world. In the United States Yiddish is widely used as a newspaper language, and has been the vehicle of many noted Jewish writers.

YOKOHAMA, *yo ko hah'mah*, JAPAN, the chief commercial center of the empire, is situated on the east coast of Hondo, on the Bay of Tokyo, seven miles southwest of the latter city, with which it is connected by railway. It is on a large harbor, which is protected by breakwaters. The city is well planned and has a number of excellent public buildings. Most important of these are the customhouse, the postoffice, the courthouse and the railway station. The city has a number of modern churches and in most respects resembles a European town. The harbor is lined with massive docks, and the surrounding heights are occupied by fine residences. It is the port through which most visitors enter Japan. On September 1, 1923, a violent earthquake followed by tidal waves and destructive fires brought ruin to this and other cities on the Bay, with loss of thousands of lives. Population, 422,942.

YONGE, *yung*, CHARLOTTE MARY (1823-1901), a novelist and essayist, born at Otterbourne, England. She was an exceedingly prolific writer, and produced in all about 125 volumes, including novels, short stories, essays, biographies, histories and school books. Her best-known novels are *The Heir of Redclyffe*, *The Daisy Chain*, *The Dove in the Eagle's Nest*, and a life of Hannah More. Her historical works include *Cameos of English History*, *English Church History* and *Landmarks of History*. She gave large sums to schools and to church and missionary work throughout the world.

YON'KERS, N. Y., in Westchester County, on the east bank of the Hudson River and on the New York Central Railroad, fifteen miles from the New York City terminal. It is beautifully located on gradually-rising ground, opposite the Palisades, and its residence section has many beautiful homes of New York business men. It is an important industrial and commercial center, with foundries and machine shops, shipyards, wire works, patent medicine and chemical factories, grain elevators, sugar refineries and manufactories of hats, carpets and rugs. Prominent buildings are a city hall, a Carnegie Library, Saint Joseph's Seminary, the Woman's Institute, the Hollywood Inn for workingmen, the Hebrew Home for the Aged and Infirm and several charitable institutions and hospitals. The Philipse Manor House, now a museum, dates from 1682. There is a steel recreation pavilion on the water front.

Yonkers was settled by the Dutch about 1650. After 1672 it was part of Philipse Manor, until the township of Yonkers was organized in 1788. The settlement itself was called Philipsburg until its incorporation into the village of Yonkers in 1855. In 1872 the northern part of the township was chartered as the city of Yonkers, and the southern part was later annexed to New York City. Population, 1910, 80,475; in 1920, 100,226, a gain of 26 per cent.

YORK, ENGLAND, county town of Yorkshire, situated on the River Ouse at its confluence with the Foss, 175 miles northwest of London. It is the seat of the York Cathedral, one of the finest Gothic structures in the world, and has many relics and reminders of early and medieval English history. The old city is surrounded by massive stone walls, and has narrow, irregular streets. A beautiful modern suburb has been built on the opposite bank of the Foss. The city's industries include flax spinning and the weaving of linen, iron founding, construction of railway cars, and the manufacture of gloves, combs, glass, etc. There is a thriving river trade. The railway station is one of the finest in Great Britain. Population, 1911, 82,282; in 1921, 84,052.

YORK, PA., the county seat of York County, ninety-six miles west of Philadelphia, on Codorus Creek and on the Pennsylvania, the Western Maryland and the Maryland & Pennsylvania railroads. It is

situated in a rich and beautiful agricultural valley and has manufactures of foundry and machine shop products, bricks, cement, lime, farm implements, wire, chains, nails, wagons, automobiles, pianos, furniture, wall paper, silk, flour and cigars. Institutions located here are the York Collegiate Institute, the York County Academy, a children's home, a county almshouse, a tuberculosis dispensary and several hospitals. There are a Federal building and two public libraries.

York was settled by Germans in 1734, and the town was laid out in 1741. The Continental Congress met here from September, 1777, to June, 1778, when it was driven from Philadelphia by the approach of Howe's army. The borough was incorporated in 1787, and the city was chartered in 1887. It adopted the commission form of government in 1913. Population, 1910, 44,750; in 1920, 47,512 (Federal census).

YORK, HOUSE OF, a royal family of England, which attempted in the Wars of the Roses to wrest the crown from the Lancastrian House, as represented by the king, Henry VI (see **ROSES**, **WARS OF THE**). The Yorkists had, indeed, the superior claim, as Richard, Duke of York, was descended from a third son of Edward III, while Henry VI was descended from a fourth son. Richard died in 1460, and his son continued the struggle; after a short time he was crowned king as Edward IV. With the exception of a short interval, Edward was king until 1483, and after his death his son was crowned king as Edward V. Richard, Duke of Gloucester, the brother of Edward IV, killed his royal nephew and was made king, but was overthrown by Henry Tudor (Henry VII), Earl of Richmond, the head of the Lancastrian House, who united the claims of the two families by marrying Elizabeth, the daughter of Edward IV.

YORKTOWN, VA., the county seat of York County, seventy miles southeast of Richmond. It has filled large space in American history on two occasions. In 1781, in the Revolutionary War, it was fortified by Cornwallis and was captured by American arms only after a siege lasting from August to October. On April 5, 1862, in the Civil War, McClellan, in command of 95,000 Federal soldiers, began a siege of the place, then strongly held by 55,000 Confederates. It capitulated on May 4. In 1881 the Cornwallis surrender was celebrated.



YOSEMITE, *yo sem' e te*, **NATIONAL PARK AND VALLEY**, one of the most magnificent scenic areas of the American Continent.

Yosemite National Park, a section of the world's "enchanted lands," lies in the central part of California, just west of the Sierra Nevada Mountains. It has

an area of a little over 1,100 square miles, and includes the famous Yosemite Valley, the Tuolumne Valley and three groves of sequoias, or California Big Trees.

Yosemite Valley. This valley, which has been aptly described as a "mere crack in the rocks," is one of the most famous of the world's regions. The valley was formed by the Merced River and by glacial action. It is seven miles long, and from one-fourth of a mile to a mile wide. The floor of the valley is a flat meadow carpeted with flowers, and from its sides rise vertical cliffs to heights varying from 3,000 to 6,000 feet. The most widely-known of the great summits guarding the valley are Cathedral Rocks, 2,500 feet; El Capitan, 3,600 feet; Sentinel Dome, 4,100 feet; Half Dome, 4,900 feet, and Cloud's Rest, 6,000 feet.

Over the sides of these cliffs numerous rivers rush headlong to the valley below, forming some of the highest and most beautiful waterfalls in the world. Among them are Yosemite Falls, which drop 1,430 feet in a single fall; Lower Yosemite, immediately below, with a fall of 320 feet; Vernal, 320 feet; Nevada Falls, 600 feet; the celebrated Bridal Veil, 620 feet, and the Ribbon Falls, 1,612 feet. This is one of the highest single falls in the world. These falls are at their best in May and June, when the winter snows are melting. Mirror Lake, in whose waters a remarkable reflection of the surrounding mountains may be seen, is another attractive feature of the valley.

Yosemite Valley is about 150 miles nearly east of San Francisco, and may be reached from Merced on the Santa Fé and Southern Pacific railroads, and by the Yosemite Valley Railroad, which extends to the western border of the park. From the railway terminus stages take tourists through the valley. The roads are good, and during the tourist sea-

son, from May 1 to November 1, hotel and camp accommodations are ample. The park is free to all, and anyone is at liberty to provide his own transportation and to travel at his pleasure, subject to such rules as are necessary for the protection of the scenery. From Yosemite Valley roads lead to Mariposa and other groves of Big Trees and to Tuolumne Valley.

Yosemite Valley was discovered in 1851 by a party in pursuit of a band of Indians, who made it their hiding place, supposing it to be inaccessible to white men. In 1864, by act of Congress, it was granted to California for a state park, upon condition that it should be kept for the use of the public and that its scenery should never be injured. The Mariposa grove of big trees, adjoining the valley, was also granted the state at the same time. Since 1890 it has been known as the Yosemite National Park. The most desirable months in which to visit the valley are June, July and the early part of August. Later in the season a number of the streams become dry, and their falls disappear.

YOSHIHITO, *yosh i he'toh*, **HARUNOMIA** (1879-), emperor of Japan, succeeded to the throne on the death of his father, Mutsuhito, July 29, 1912. He was educated at Tokyo, and speaks fluently French, English and German. He is simple and direct in his manner and speech, and his policy is progressive. Much tact and discretion have been shown by him as a harmonizing influence between the traditions and ideals of old Japan and the up-to-date ideas of the Western world, with which Japan must keep abreast to maintain its position as a world power. The emperor's personal taste inclines toward outdoor sports, and he is a lover of dogs and horses. In 1900 he married his cousin, Princess Sada-Ko, and has three children, the oldest, Hirohito, being the heir apparent to the throne.

YOUNG, *yung*, **BRIGHAM** (1801-1877), the successor of Joseph Smith as president of the Church of Jesus Christ of Latter-Day Saints. His father was a Vermont farmer, and he himself learned the trades of painter and glazier. Early in life he joined the Baptists, but was converted to Mormonism and joined the sect at Kirtland, Ohio, in 1832. In 1835 he was ordained one of the Council of Twelve Apostles. When the sect began to be persecuted Young and Smith selected Nauvoo, Ill., as the site for a new

colony. On the death of Joseph Smith, in 1844, Young was unanimously chosen president.

When the Mormons were expelled from Nauvoo he led them through toils and dangers over the plains and tablelands to the splendid valley where, between the Wasatches and the Great Salt Lake, he founded, in July, 1847, the settlement which became Salt Lake City. The Mormons organized their territory into a state, and Young became governor. Later, difficulties arose with the Federal government and President Buchanan appointed a territorial governor to succeed Young. He continued ruler of his sect until his death in 1877. He was a man of strong character, remarkable foresight and unusual executive ability.

YOUNG, CHARLES AUGUSTUS (1834-1907), an American astronomer, who graduated at Dartmouth in 1853 and after teaching at Phillips Academy, Andover, in 1856 became professor of natural philosophy and mathematics in the Western Reserve College, Ohio. In 1877 he was appointed professor of astronomy and natural philosophy at Princeton, after serving in the same capacity at Dartmouth. Young made the first observation of the spectrum of the solar corona (the luminous envelopes of the sun) in August, 1869, and later he made many other important observations. He gave his assistance to the eclipse observations in Iowa in 1869, in Spain in 1870, in Denver in 1878, and was one of the party who studied the transit of Venus at Peking in 1874. He was one of the foremost authorities on the subject of spectra. *The Sun, General Astronomy, Elements in Astronomy* and *Lessons in Astronomy* are among his publications, which include also textbooks and papers on miscellaneous scientific subjects.

YOUNG, EDWARD (1683-1765), an English poet, born at Upham, Hampshire. His earliest large work was *Busiris*, a tragedy written in 1719. This was followed by *Revenge* and a group of satires entitled *The Love of Fame, the Universal Passion*. He took holy orders, and in 1730 became rector of a church at Welwyn in Hertfordshire. Young is chiefly remembered for his *Night Thoughts of Life, Death and Immortality*, a religious poem containing numerous pointed verses which have become axiomatic.

YOUNG, ELLA FLAGG (1845-1918), a prominent American educator. Mrs. Young

was educated in the public schools of Chicago, graduating from a Chicago high school and from the Chicago Normal School. In 1900 she received the degree of Ph.D. from the University of Chicago. She began teaching in 1862, making rapid advancement in her profession. From 1887 until 1899 she was district superintendent of the schools in Chicago, and from 1899 until 1905, she held a professorship in the University of Chicago in the department of education. In 1905 she was chosen principal of the Chicago Normal School, and was one of the most efficient principals that institution ever had. In 1909 she was unanimously elected superintendent of schools in Chicago, one of the most important educational positions in the United States. Her work as superintendent of schools was such as to command the highest admiration. In 1910 Mrs. Young was honored with election to the presidency of the National Education Association, the first woman to hold that position. In the same year she was also elected president of the Illinois State Teachers' Association.

YOUNG ITALY, a society founded by Mazzini in 1831 for the purpose of freeing Italy from Austrian rule and uniting the different states as a republic. The first open movement, the invasion of Savoy in 1834, failed, and this fact lessened the influence of the society. Its work was not entirely vain, however, as it contributed greatly to the growth of the patriotism which resulted later in the unification of Italy.

YOUNG MEN'S CHRISTIAN ASSOCIATION, or the "Y. M. C. A.," is an organization for the promotion of spiritual, intellectual, physical and social welfare among men. Its purpose is not to supplant the work of the Church, but to coöperate with all churches in the promotion of welfare work among men and boys. The object of the organization at its beginning was the conversion of men to Christianity and the strengthening of the Christian life of its members, but its scope has broadened to include the union of Christians of all denominations in lines of work that can be promoted by united action; to carry the gospel among the railroad and other workers; to unite college students for active Christian work; to coöperate with foreign Christian young men for the salvation of their fellows; to bring together in sympathy and companionship for Christian work the young men of every sec-

tion of the United States and Canada; to secure the services of, and financial aid from, Christian laymen in spreading the gospel, and generally to promote the common cause and extend religion among all orders and conditions of men. In pursuit of the accomplishment of these objects, the association has founded missions, secured positions for young men, strangers and penniless in cities and in the country; acted in capacities of nurses and humanitarians; secured legislation against the publication and circulation of obscene literature; officiated as almoners for the distribution of funds, food and clothing among the deserving poor; established schools, libraries and lectures, and exerted a powerful influence for the general good.

The association has established comfortable homes and hotels in large cities, and any young man for a nominal membership fee is admitted to the privileges which these buildings afford. The general buildings are equipped with reading rooms, libraries, gymnasiums and recreation rooms, and many of them are provided with swimming pools that are open the year round. In the largest centers Bible classes, lectures and social entertainments are provided, and in Chicago, Springfield, Mass., Los Angeles, Philadelphia and New York practically all lines of educational work, from that in the elementary schools to that of college grade, are offered.

There are special branches for railroad men, college students, soldiers and sailors, Indians and negroes, and the field work has been extended to many rural communities. A boys' department is a large and important feature of the organization, and branches of this department are found in nearly all city and county organizations. Secretaries who are especially trained devote all their time to the boys' work. Classes and separate rooms are provided for their use, and many summer camps are maintained under the direction of the secretaries.

The executive officers have the title of secretary; most of them are university men, or men who have received special training in the Y. M. C. A. colleges, at Chicago or Springfield, Mass. Special summer schools are also maintained at Lake George, N. Y., and at Lake Geneva, Wis. In 1918 there were in America 2,193 associations, 674,000 members and 4,963 employed secretaries and other officers. The students in the educational classes numbered 82,000, and the mem-

bership in the boys' department was over 152,000. The net property of the association and funds amounted to \$107,707,200. Membership is open to men without regard to creed, race or color, but only those who are members of evangelical churches can vote on constitutional questions and hold office.

Work in the World War. At the outbreak of the World War the British associations began work among the troops in practically every training camp and at the front, and over 700 centers containing reading and recreation rooms were established. When the United States entered the war, the association offered its services to the government, and immediately started a campaign to raise funds for establishing centers at the various training camps for the regular army. The sum of \$50,000,000 was secured, and additional funds were raised for carrying on the work in Europe. On January 1, 1918, the association had sent 800 workers to France, including 150 women, who served in the canteens.

The Y. M. C. A. centers at the front, known as huts, included a canteen room, or restaurant, small rooms for classes and other gatherings and a lecture hall. Before the close of the war there were 4,557 secretaries serving the soldiers in camps at home and 7,000 with the expeditionary forces in France. At the earnest request of the governments of France, Italy and Russia, Y. M. C. A. representatives were sent among their armies. The work was costing the association over \$7,000,000 a month when the armistice was signed.

The work of the Y. M. C. A. was of the greatest value to the armies; it relieved homesickness, provided recreation, strengthened the morale of the troops and offered religious teaching and classes in various lines of educational work. In addition to this, the work among prisoners of war resulted in relief from much suffering.

History. The first Y. M. C. A. association was formed during 1845, when George Williams of London, England, a clerk sixteen years of age, persuaded his fellow clerks to meet for prayer and Bible study. But similar movements had existed in England from 1632. The first American Association was formed in Boston in December, 1851. Since that date, associations have been organized in nearly every city, town and village of the United States and Canada.

The associations are organized into city, county and state groups. Many of the associations have become incorporated under the laws of the several states wherein they are domiciled and are clothed with powers and privileges of corporate bodies. In 1883 the international committee, composed of twenty-seven members, was incorporated under the laws of the State of New York, and in 1888 delegates from the United States were in attendance upon the international convention held at Stockholm, Sweden. The headquarters of the central international committee are at Geneva, Switzerland, and the committee is composed of representatives from America, Australia, Austria-Hungary, Belgium, Denmark, England, France, Germany, Italy, Netherlands, Norway, Russia, Spain, Sweden, Switzerland and other countries.

YOUNGS'TOWN, OHIO, the county seat of Mahoning County, sixty-seven miles southeast of Cleveland, on the Mahoning River and on the Erie, the Pennsylvania, the Baltimore & Ohio, the Mahoning Valley, the New York Central, the Pittsburgh & Lake Erie and the Lake Erie & Eastern railroads. The manufacture of iron and steel is the most important industry, and there are also lumber mills, bridge works, and furniture, engine, automobile, wagon and other factories. Youngstown is the seat of a number of charitable institutions and hospitals, and has a Federal building and the McMillan Free Library. Mill Creek Park, 482 acres in extent, is regarded as the most beautiful natural park in the state of Ohio. The first settlement was made by John Young on a tract of land purchased from the Connecticut Land Company in 1797. It became the county seat in 1876, and was incorporated as a city in 1848. Population, 1910, 79,066; in 1920, 132,358.

YOUNG TURKS, the name applied to a reform party which forced the abdication of Sultan Abd-ul-Hamid in 1909. It was thought by observers in other countries that the revolt foreshadowed a new era of democracy in the Ottoman Empire, but this was a mistaken idea. The strengthening of Turkish power in various sections of the empire seemed to be the chief object of the Young Turks, and no material political reforms resulted. See **TURKEY**.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION, an international association of women operated on a plan similar to that of

the Young Men's Christian Association, its purpose being to promote the welfare of young women, chiefly women in business everywhere. Organized in 1894, it to-day embraces eighteen national organizations scattered throughout the world, and has a total membership of 800,000. The headquarters are in London.

The American Y. W. C. A., formed in 1906, was an outgrowth of the Ladies' Christian Association, a society which had been organized in 1858 in New York and which had established many branches in the fifty years of its growth. At present there are about 1,000 associations in the United States, with a total membership of 350,000. An annual *Year Book* is published, showing what has been accomplished in the twelve months immediately preceding. In Canada there are about seventy-five affiliated bodies, with a total membership of 18,000. *The Association Monthly* is the official organ of the international association.

YPRES, e'pr', BELGIUM, a ruined city which was the center of desperate fighting throughout the World War. It was the capital of West Flanders, and was situated thirty-five miles south of Ostend, on the Yperlée River. On October 3, 1914, it was occupied by the Germans, who were driven out by the British a few weeks later. The allied forces continued to hold the Ypres line, but at the cost of much sanguinary fighting. In the spring of 1915 a new attack was delivered by the Germans, in which they used poison gas for the first time. Only the heroic resistance of the Canadians saved the day for the allies, who managed to hold the town after suffering great losses. Even as late as the spring of 1918 the salient was the scene of most desperate struggles, but the ruins of the city remained in allied hands. Before the war Ypres had a population of 17,000, and was a center of the lace and linen trade. It had many fine buildings, including the beautiful cathedral of Saint Martin, dating from the thirteenth century. The soldiers called the place "Wipers." See **WORLD WAR**.

YPSILANTI, ip se lan'te, MICH., in Washtenaw County, thirty miles southwest of Detroit, on the Huron River and on the Michigan Central and the New York Central (Lake Shore & Michigan Southern) railroads. Interurban lines connect it with Detroit and Ann Arbor. It is the business center for a considerable agricultural region; and is con-

nected by several electric railways with other cities. The principal manufactures are flour, paper, knit goods, dairy products and agricultural implements. The Michigan State Normal College, the first normal school to be established west of Massachusetts, is located here, and the city has parks, two banks, a business college, public and school libraries and a Federal building. The town was laid out in 1825 on the site of an Indian trading post. It was chartered as a city in 1858. Population, 1920, 7,413.

YSAYE, *e zah'ye*, EUGENE (1858–), a Belgian violinist, born at Liège. He was taught by his father, an able violinist, who in time sent him to the Liège conservatory. Subsequently he studied under great masters of the violin. He showed such promise that the state helped him to complete his studies at Paris. In 1881 he began the concert tours which were to reveal him to the world as one of its foremost violinists. Five years later he became director of the violin department of the Brussels conservatory, where he organized the famous Ysaye quartet. He retired in 1898 to devote all his time to concert work. Ysaye's playing is characterized by a sound and brilliant technique and a rich, full tone having an infinite variety of shading. He has written a number of compositions for the violin; among them are six concertos.

YUAN SHI KAI (1858–1916), Chinese statesman, first President of China. As a young man his fondness for military life led him to active service in Korea, where his work attracted the notice of Li Hung Chang, and brought him the office of resident-commissioner of trade. His rise was rapid, and during the Boxer rebellion he gained an international reputation for his efforts to protect foreigners. Though a supporter of the monarchy, Yuan Shi Kai was a reformer. His innovations finally led to his dismissal from power in 1908, but in 1911 he was recalled to the office of Premier. He tried to bring about a compromise between the Manchus, the constitutional reformers and the revolutionists. After the abdication of the emperor in 1912, Yuan Shi Kai, "the strong man of China," became the first regular President of the Chinese Republic. Yuan, however, soon showed a disposition to take the government into his own hands and by 1914 he was exercising the power of dictator. Late in 1915 it was announced that the Presidency would thereafter be hereditary in

Yuan's family, and in December he was proclaimed emperor. Before it was possible to have a coronation ceremony, mutinies, revolts and intervention by the powers caused a restoration of the republic. In June, 1916, Yuan died, by poisoning, according to reports. See CHINA, subhead *History*.

YUCATAN, *yoo kah tahn'*, a peninsula constituting the extreme southeastern part of Mexico and embracing the states of Campeachy and Yucatan. It projects northward between the Gulf of Mexico and the Caribbean Sea, and is a trifle smaller than the state of Iowa. There are extensive coral formations in the shallow waters along its shores. The climate is hot and humid, and the principal product is sisal hemp, the world's chief supply, 200,000,000 pounds annually coming from this source. The population is made up of natives, chiefly Yaqui Indians, and Spaniards. The natives are intelligent and dependable laborers. Within the peninsula are interesting remains of the ancient race of Maya Indians. See MEXICO.

YUC'CA, a genus of plants belonging to the lily family, native of North America. Yuccas are common in Mexico. A species known as *Adam's needle* is characterized by a profusion of beautiful, bell-shaped flowers and long evergreen leaves. The *Yucca gloriosa* has a two-foot stem, on the end of which grows a cluster of leaves and in the midst of the leaf-cluster a flower stalk bearing numerous drooping bells, striped with purple. The *Yucca glauca* of the western part of the United States has a fiber suitable for making cordage and baskets. The Mexican Yucca tree bears a juicy fruit.

YUKON RIVER, one of the largest rivers of North America. It rises in the west central part of the District of Yukon, Canada, flows northward and northwestward into Alaska, then westward and southwestward, entering Bering Sea sixty miles southwest of Michael. Its total length is about 2,200 miles. It is fed by numerous streams which are the outlets of marshes and lakes. In some places the current is swift and the river is obstructed by rapids. Small steamers have descended all these rapids, but those at White Horse form an impassable barrier to up-river steamers, so that the river is divided into two navigable sections, which are now connected by railway. The discovery of gold in the Klondike region and along the banks of the Yukon has brought this stream into special

prominence since 1896. During the open season steamers make regular trips as far as White Horse, and smaller boats go to Dawson, in the Canadian Yukon Territory.

YUKON TERRITORY, a political division of the Dominion of Canada, popularly called **THE YUKON**. It is located in the extreme northwest, between the North West Territories on the east and Alaska on the west. British Columbia bounds the territory on the south, and the Arctic Ocean is on the north. The sixtieth parallel forms the dividing line between the Yukon and British Columbia, and the 141st meridian (W.) the line between the territory and Alaska. The North West Territories and the Yukon are separated by the Rocky Mountains.

Having an area of 207,076 square miles, the Yukon is about one-half the size of Ontario, one-sixth the size of the North West Territories, and lacks about 59,000 square miles of being as large as Texas. It is almost exactly twice the size of Colorado. Of the total area, 649 square miles are water. The territory is irregularly triangular in shape, the broadest portion being the southern boundary, and the narrowest the Arctic shore line. It is sparsely populated, the census of 1911 showing 8,512 inhabitants. In 1901, during the gold-mining boom, the population was 27,219. Dawson, the capital, is the chief town. It has a population of about 4,000.

Physical Features. In general the surface of the territory is a rolling plain diversified by mountains and river valleys. The average elevation is from 2,000 to 3,000 feet, but in the extreme southwest, near the Alaska border, Mount Logan towers 19,539 feet above the sea. It is the highest peak in Canada, and next to Mount McKinley is the highest in North America. There are several other peaks in this region which are from 15,000 to 18,000 feet in altitude. Branches of the Yukon River traverse the territory over most of its area, but the southeastern corner is drained by the Liard River, which belongs to the Mackenzie River system.

Resources and Industries. Gold is by far the most valuable resource of the Yukon. In 1896 rich deposits were discovered in the

Klondike, near the Alaska boundary, and when the fact became known thousands of prospectors flocked to the district to make their fortunes. In 1900, when the boom was at its height, gold to the value of \$22,275,000 was taken from the mines. After the exhaustion of the placer deposits, more expensive methods of mining were introduced, which caused a marked decline in yield and in the population of the region. The yearly output is now valued at about \$5,000,000.

There are no other industries of importance, though home requirements are partially met by farming and manufacturing, carried on in a small way. Small crops of rye, barley and garden vegetables are produced. The summers are very short and frosts occur throughout the year, but these disadvantages are somewhat offset by the long summer days. At Dawson the longest days have about twenty hours of daylight.

Government. Before the discovery of gold in the Yukon, the territory was inhabited only by a few Indians, but the sensational finds in the Klondike brought large numbers of settlers into the region. Parliament then organized a government to meet the requirements of the population. The territory is now governed by a commissioner appointed by the governor-general in council, and a territorial council. Any voter may be a councillor, but the qualifications of voters are determined by the commissioner and his council. To be eligible to vote a man must be over twenty-one years of age and must have resided in the district for at least twelve months previous to the election.

Related Articles. Consult the following titles for additional information:

Alaska
Dawson

Klondike
Yukon River

YU'MA, a small tribe of Indians, formerly residing on both sides of the Rio Colorado about fifty or sixty miles from the mouth of the river, and now confined to a reservation in Southeastern California. They are a fine tribe physically, and are in no sense nomadic, seldom leaving their villages, where they practice a rude form of agriculture, raising corn, beans, pumpkins and melons. They number about 800.



Z, the twenty-sixth and last letter of the English alphabet, occupying the same position as in Latin. It is derived, through the Greek and Latin, from the Phoenician alphabet, in which, however, it was the seventh character. In English *z* was little used before the fifteenth century. It is properly a double consonant, compounded of *d* and *s*, but it has acquired the pronunciation of the hard terminal *s*. *S* or *ss* is, indeed, frequently used in place of *z*, as in *choose*, *dissolve*.

ZAMBE'ZI, a river of Southern Africa, which rises in the eastern part of Angola, where it is formed by the union of several smaller streams, generally known as the Seven Springs. It flows southward, eastward, northeastward and then southeastward, finally entering the Mozambique Channel through a number of delta arms. For a part of its course it forms the boundary between Rhodesia and German Southwest Africa. Its upper course is through an expanse of country clothed with grass and forest. After entering Rhodesia it plunges over a precipice nearly 400 feet high, forming the celebrated Victoria Falls (see VICTORIA FALLS). Below the falls the river has a winding course of about eighty miles through a deep canyon, with almost perpendicular banks. In its lower course it flows through a low, open country.

Its entire length is about 1,650 miles. It is navigable for large steamers to the first series of rapids, 400 miles from the sea. Above this point another section is navigable to Zumbo, on the western border of Portuguese East Africa. Several lines of steamers ply regularly upon the river, and the Cape-to-Cairo railway crosses it on a magnificent steel bridge erected just below Victoria Falls. The Zambezi is the fourth river in Africa in size and, together with its tributaries, exceeds 4,000 miles in length. The first European to

see the river was Livingstone, who reached it in 1854.

ZANESVILLE, *zaynz'vil*, OHIO, the county seat of Muskingum County, sixty miles east of Columbus, on the Muskingum River, at the mouth of the Licking, and on the Baltimore & Ohio, the Pennsylvania, the Wabash, the New York Central, the Wheeling & Lake Erie and the Ohio River & Western railroads. The surrounding country is a farming region, and it also contains deposits of limestone, clay and coal. The rivers furnish good water power, and there are potteries, terra cotta works, paving block plants, tube mill and sheet mill plants, railroad shops, implement and wagon works, flour mills and other factories. The tile plant is said to be the largest in the world. The city has a Federal building, a courthouse, a Carnegie Library, a Masonic Temple, an Odd Fellows' Hall and a Soldiers' and Sailors' Memorial Hall. A city market supplies provisions to the population at low cost. The town was founded by Jonathan Zane and John McIntire in 1799. It was the capital of the state from 1810 to 1812, and was incorporated in 1814. Population, 1910, 28,026; in 1920, 29,569, a gain of 6 per cent.

ZANG'WILL, ISRAEL (1864—), a British miscellaneous writer, born in London, of Jewish parentage. He was educated at the Jews' Free School, Spitalfields, London. His lectures in England, Ireland and the United States brought him prominently before the public, and he became a leader in the Zionist Movement (which see). His writings include essays, dramas, novels and humorous sketches; he is particularly clever in depicting Jewish life and character. Early Jewish studies are *Children of the Ghetto* and *Ghetto Tragedies*. *Dreamers of the Ghetto* contains sketches of great Jewish thinkers. *The Mantle of Elijah*, *They That*

Walk in Darkness and *Ghetto Comedies* are among his other writings. His most successful plays are *Merely Mary Ann* and *The Melting Pot*.

ZANZIBAR, *zahn ze bahr'*, an island off the eastern coast of Africa, forming a part of the British protectorate of Zanzibar. Its area is 640 square miles, and it is mostly low, the highest point being only 1,000 feet above the sea. The island is fertile and well cultivated. Cloves, copra, tobacco, vanilla, coconuts and other crops are grown. Fishing and cattle raising are important industries. The population, numbering about 197,000, includes Arabs, Persians and representatives of most of the native tribes of Eastern Africa. There are only a few Europeans. Moham-medanism is the chief religion.

Zanzibar, the capital and chief town of the island, contains the palaces of the sultan, the barracks, the fort, hospitals and a number of mission stations. It is an important port in the Eastern trade and has some manufactories. The population is 35,262.

The nominal head of the government is a native sultan, born in 1907. The island is administered by a British consul general.

ZEALAND, *ze'land*, the largest and most easterly island belonging to Denmark, containing Copenhagen, the capital and largest city of the kingdom. It is situated between the peninsula of Jutland and Sweden, and its outline is very irregular. The greatest length from north to south is eighty miles, its greatest breadth is sixty-five miles, and the area is 2,680 square miles. Most of the island is low, the greatest elevation not exceeding 400 feet. The land is covered with forests or fertile fields. Population, 1911, 1,096,897.

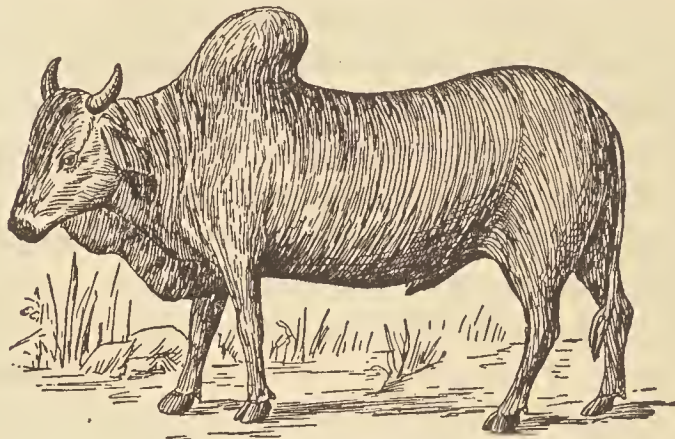
ZE'BRA, a wild animal of South Africa, closely related to the wild ass and the horse, and having habits similar to those of the latter. It is grayish or cream-white in color, and is conspicuously marked with dark stripes on head, legs and body. In Africa zebra-hunting is a popular sport. The natives eat the flesh and use the hides for leather and as rugs. Until comparatively recent times great herds of zebras were common in Southern



ZEBRA

Africa; to-day the animals are rare. The zebra most frequently seen in Africa and in menageries is Burchell's zebra, whose native heath is the central plains. See QUAGGA.

ZE'BU, a species of ox, a native of India, whence it has spread into Persia, Arabia and Eastern Africa. It is used as a beast of burden, for plowing and hauling. The animal is remarkable for a convex forehead, short horns, large drooping ears and a fatty hump on the back. It is very gentle and docile.



ZEBU

Zebus vary greatly in size, the smallest being no larger than a large dog, while others are the size of a large ox. The colors vary. The white zebu bulls are regarded as sacred among the Hindus (who call them *brahmany*) and are allowed a free range. Zebus have been imported to Jamaica and Central America for use on farms.

ZEB'ULUN, one of the twelve tribes of Israel, named, according to Genesis XXX, 20, after the sixth son of Jacob and Leah. The name was also given to a country in Northern Palestine.

ZECHARIAH, *zek a ri'ah*, son of Berechiah, son of Iddo, appeared as a prophet in Jerusalem, along with Haggai, in the second year of Darius Hystaspes (520 B. C.), encouraging the Jews to commence the restoration of the Temple.

ZEDEKI'AH, last king of Judah, the son of Josiah, and successor of Jehoiachim. He broke his oath of allegiance to Nebuchadnezzar and united with Egypt against him. He was made captive when Nebuchadnezzar conquered Jerusalem in 586 B. C., his sons were killed in his presence, and he was taken a prisoner to Babylon, where he died. The name was borne also by two false prophets.

ZEISLER, FANNY BLOOMFIELD. See BLOOMFIELD-ZEISLER, FANNY.

ZEMST'VO, the governing body of a province or district in Russia before the revolution

of 1917. It was composed of representatives chosen by the peasants, the householders of the towns and the landed proprietors. This body was presided over by the president of the nobility of the district or province, and it was charged with the administration of economic affairs. The executive power of the *zemstvo* was entrusted to an *upraba*, elected by the assembly. See RUSSIA.

ZENANA, *ze nah'nah*, among the Hindus that part of the house set apart for women. In Bengal the women occupy a separate building behind that of the men; the rooms open upon an inner court, and the inmates are entirely separated from the outside world. In 1855 Protestant missionaries organized the Zenana Mission for the purpose of alleviating the conditions of zenana inmates.

ZEND-AVES'TA, the sacred book of the Parsees, a religious sect of India, followers of Zoroaster. It contains songs of praise, prayers, the liturgy and a priestly code. It was first translated in 1771 by Anquetil-Duperron, a French scientist.

ZE'NITH, a term used in astronomy to indicate the point in the heavens directly overhead. It is opposite of nadir (which see).

ZE'NO, the founder of the Stoic school of philosophy, was born of a merchant family of Citium, in Cyprus, about the middle of the fourth century B. C., and is said to have lived about eighty years. According to tradition, he was shipwrecked and went to Athens, where he first read the works of Socrates' disciples. He studied Cynic doctrine, then turned to Stilpo, later to the teachings of Xenocrates and of Polemo. He then founded at Athens a school of philosophy in what was called the "Painted Porch," where he is said to have taught fifty-eight years. He practiced and taught temperance and virtue and was much esteemed by his fellow citizens, who erected a bronze monument to his memory after his death. See STOICISM.

ZENO'BIA, queen of Palmyra, Arabia, who succeeded to the throne as regent for her son, on the murder of her husband, Odenathus, in A. D. 267. She aimed at a dominion which should include Egypt, Syria and Asia Minor, and should make good her title of "Queen of the East." Her ambitions clashed with Rome, and in 272 her armies were defeated by those of Aurelian. She was taken captive to Rome, but the emperor was so impressed with her beauty and elevation of

character that he gave her a villa on the Tiber, and Zenobia's daughters were married into noble Roman families.

ZEPHANIAH, *zef a ni'ah*, a Hebrew prophet, who flourished in the reign of Josiah, 600 B. C. His book of three chapters, the ninth of the Minor Prophets, predicts the desolation of Judea, as a punishment for idolatry and worldliness.

ZEPPELIN, *tsep e leen'*, COUNT FERDINAND (1838–1917), a celebrated aeronaut, born in Constance, Germany. He was educated at the Polytechnical School in Stuttgart and at the military school at Ludwigsburg. In the Franco-German War he was promoted to the rank of lieutenant-general. After many experiments with dirigible balloons, of which he was the inventor, he made his first flight from Berne to Lucerne in 1892. After this he made numerous models and improvements and in 1913 constructed a passenger airship which traveled from Baden-Baden to Vienna in eight hours, half the time required for the trip by train. A Zeppelin designed for trans-oceanic travel exploded in mid-air in 1913, destroying all on board. Zeppelins were much used in the World War, but did not fulfill the expectations of their makers as vehicles for bombing or scouting expeditions, being outstripped for war purposes by the lighter and swifter aeroplane. See FLYING MACHINE.

ZE'RO, in mathematics, a symbol (0) denoting the absence of quantity or value; also, the symbol of an infinitesimal quantity. The same term is used to represent the point from which measurement is recorded on a scale. It is also used on thermometers. In this connection, however, zero does not denote temperature. On centigrade thermometers it indicates the freezing point of water; on the Fahrenheit scale it indicates 32° below the freezing point. Entire absence of heat, scientists agree, is represented by a temperature of 273 degrees (C.) below zero. See THERMOMETER.

ZEUS, *zuse*. See JUPITER.

ZEUXIS, *zuke'sis*, a famous Greek painter, probably born at Heraclea, on the Euxine, about 450 B. C. Time has effaced his masterpieces—*Hercules Strangling the Serpent*, *Jupiter among the Gods*, *Marsyas Bound*, *Pan and Helen*—which were the admiration of ancient critics. Zeuxis was a contemporary of the celebrated painter Parrhasius. See PAINTING.

ZINC, *zink*, or **SPEL'TER**, a metallic element, in appearance resembling lead but much harder than the latter metal and about one-third as heavy. At 212° it becomes malleable, at 302° it can be drawn out into fine wire. It is obtained from ores, and is one of the most useful metals known. The principal zinc ores are the carbonate, or *Smithsonite*; the oxide, or *zincite*; the hydrated silicate, or *calamine*; and the sulphide, or *sphalerite*, commonly called *zinc blende*. From the last most of the zinc of commerce is obtained. Deposits of zinc ore occur in most of the countries of Europe; in the United States the ores are found chiefly in Missouri, Kansas, New Jersey, Pennsylvania, Wisconsin, Tennessee and Arkansas. British Columbia is a source of supply. The Missouri and Kansas mines are the most important in America, producing about sixty per cent of the country's total annual output of 600,000 tons. Zinc is known in the trade as spelter.

Commercial zinc is produced chiefly by a smelting process. The ore is roasted; the oxide thus set free is heated with charcoal in earthen pipes, and the powder is reduced to a liquid in iron crucibles. Zinc is marketed in the form of sheets and small bars. It is employed in the arts, especially in the manufacture of brass, German silver and other alloys, and in making printing plates for etchings. It is also used in making the positive plates for electric batteries, in galvanizing iron sheets for roofing and iron wire for telegraphs; in lining tanks and in protecting woodwork from the heat of stoves.

Among the most important commercially of the compounds of zinc are *zinc chloride*, a compound of zinc and chlorine, used in medicine as a caustic, a disinfectant and a deodorizer. It is a preservative of timber, the chloride solution being forced under pressure into the pores of the wood. Railway ties are treated in this way. The same compound is also used to add weight to cotton goods. *Zinc sulphate*, formerly known as *white vitriol*, is a white powder used in dyeing and calico printing, in the manufacture of varnishes and drying oils, and in the preparation of zinc white (used in making white paint for interiors) and other zinc compounds.

ZINC ETCHING, a plate for the reproduction in printing of drawings or lettering in ink; also the process by which it is made,

sometimes called the line-cut process. A photograph on glass is made of the drawing, and the negative, reversed, is clamped to a highly-polished plate of zinc which has been coated with wax or some other substance to protect it from the action of acid. The zinc plate is then subjected to electric light or to sunlight till the drawing is transferred to the sensitized surface, the lines are etched by means of a corrosive acid, and the plate is nailed to a block to make it the same height as type. Zinc etchings are quickly and inexpensively made, and for this reason are commonly used in the illustration of newspapers and many books. For the reproduction of photographs and other pictures, in which it is necessary to preserve the shading, the more complex halftone process must be used. See **HALFTONE**; **PHOTOGRAPHY**.

ZIN'NIA, a genus of plants belonging to the family Compositae. There are sixteen species, native to Mexico and the Southwestern United States. Zinnias bloom freely all summer, and thrive best in a rich loam with sunny exposure. The garden zinnia, with single and double flowers of many shades of red and yellow, is the best-known species. The stem is stiff and hairy, and grows to a height of one to two feet. Each of the several branches is topped by a single flower head made up of many florets. When successfully cultivated, the zinnia is a showy plant with vivid scarlet, crimson, yellow and other hues. It does not always turn out well, however, as the colors sometimes are muddy. The flowers lack pleasing fragrance.

ZI'ON. See **JERUSALEM**.

ZI'ONIST MOVEMENT, or **ZI'ONISM**, a recent widespread movement among the Jews resulting chiefly from persecutions of them in various countries and having as its object the reestablishment of a Jewish state in Palestine. Ever since Jerusalem was wrested from the Jews by Rome (see **JERUSALEM**), the Hebrew people have hoped to recover this land of their early fathers, and at various times Zionist agitations have been set on foot.

By far the most significant of these was started in the last years of the nineteenth century. Unlike earlier Zionist movements which sought primarily to gain possession of the Holy City, the idea behind this one was practical and political, as well as religious, and was an attempt to solve the

problem of persecuted Jews in many lands by finding a home for them where they might enjoy some form of self-government. This idea found expression in a pamphlet written in 1896 by Dr. Theodore Herzl, a Vienna journalist. Interest in the movement led to an international Zionist congress at Basel, Switzerland, in the following year.

The congress discussed means for obtaining governmental grants as a necessary preliminary to establishing settlements of Jews in Palestine. Subsequent congresses provided for the establishment of a national fund, and about \$2,000,000 was collected from Jews throughout the world to promote the project. Negotiations were started with a view to making Palestine a tribute-paying state under the suzerainty of Turkey, and when the plan failed an attempt was made to secure a grant of territory from Great Britain in the vicinity of the Holy Land. This also was without fruition, and the offer by Great Britain in 1913, of the East Africa Protectorate as a site for a Jewish colony, was wrathfully rejected by the Jews, who refused to accept any nationalist plan which did not embrace the traditional idea of Palestine regained.

Within recent years the Zionist leaders have been chiefly interested in developing the physical resources of Palestine and in ameliorating the condition of Jews already there. This has resulted in the emigration of many Russian and Rumanian Jews to Palestine and the establishment of self-governing colonies there. The way has been opened to promote agriculture and the trades. Schools and banking systems have been established, and the Hebrew language has been revived. At the outbreak of the World War there were about forty colonies, each with a population ranging from a few families to 2,000 persons.

The outcome of the World War made the establishment of a Jewish state in Palestine a near possibility. In December, 1917, the British captured Jerusalem, and before the close of the war all Palestine had been freed from Turkish rule.

Early in 1918 a Zionist commission was sent from England to Palestine, the American Zionist organization providing most of the funds for its activities. A legion of Jewish young men from various countries was formed to aid the movement, all being volunteers. Judge Brandeis of the United States

Supreme Court is a prominent Zionist, as is Nathan Straus, New York merchant and philanthropist.

Palestine remained under British military control until 1920, and was then placed under mandate to Great Britain, and a civil government was established. It is proposed to guarantee equal treatment to the people, and to provide a national home for the Jews. The Jewish colonies have increased in number, and in size, but present economic conditions prevent a rapid development.

ZIRCO'NIUM, a metallic element occurring either in the form of a black powder or as gray crystals. It was discovered in 1789 by Klaproth, in combination with silica, in the mineral known as zircon. Its use is very limited. The powder combined with oxygen forms the dioxide known as zirconia, used in making mantles of Welsbach lights and Nerst lamps.

ZITH'ER, a common, stringed musical instrument, especially popular in Germany and the Tyrol. About thirty gut and wirebound silk strings are arranged horizontally on a frame over a wooden sounding board. The instrument is placed on a table or on the knees.



ZITHER

The strings are plucked by the fingers of the right hand and with the thumb the latter capped with a metallic plectrum.

ZO'DIAC, the zone or belt of the celestial sphere extending eight degrees on each side of the ecliptic, or plane of the sun's center containing the earth's orbit. It was divided by early astronomers into twelve sections of thirty degrees each, and the constellations within the respective sections came to be designated, for brevity's sake, by certain signs.

The twelve signs of the zodiac are Aries (♈), the Ram; Taurus (♉), the Bull; Gemini (♊), the Twins; Cancer (♋), the Crab; Leo (♌), the Lion; Virgo (♍), the Virgin; Libra (♎), the Balance; Scorpio (♏), the Scorpion; Sagittarius (♐), the Archer; Capricornus (♑), the Goat; Aquarius (♒), the Waterman; Pisces (♓), the Fishes.

ZODI'ACAL LIGHT, a nebulous light which appears in the west after sunset and

in the east before sunrise. It is triangular in shape, with base resting on the horizon and apex at varying heights. In the tropics it is visible the year round and is as distinct as the Milky Way. In middle latitudes it is seen in the winter and spring in the evening, and at dawn from September to spring. It is believed by some astronomers to be the reflection from a multitude of meteorites revolving about the sun.

ZOLA, *zo lah'*, EMILE (1840–1902), a noted French author. He had published several novels and won considerable notice before beginning, in 1869, his great series in twenty volumes, recounting

the complete story of an imaginary French family under the Second Empire. The entire work is known as *The Chronicle of the Rougon-Macquart Family*. These books, like so many of Zola's other works, deal largely with the dark side of



EMILE ZOLA

life, with crime and vice, and picture vividly and accurately certain phases of Parisian Society. Some of the titles in the series are *The Fortune of Rougon*, *The Curée*, *The Conquest of Plassans*, *the Abbé Mouret*, *Eugène Rougon* and *His Excellency*. Of his later works the most important were the two series, *Lourdes*, *Rome*, *Paris*, and *Fruitfulness*, *Labor*, *Truth* and *Justice*, this last unfinished at his death.

Zola championed the cause of Captain Dreyfus, an officer in the French army unjustly accused of selling military secrets to Germany. He was forced to flee the country, but in 1899, after the acquittal of Dreyfus, he returned, and he died at Paris three years later.

ZOLLVEREIN, *tsole'fe rine*, a German word meaning *customs-union*, was a German commercial union formed under the leadership of Prussia, in 1818. At the beginning of the last century what is now Germany was made up of numerous small independent states, each with its own tariff regulations. This complicated system restricted commerce, and in 1818 an agreement was reached whereby internal customs were abolished. All import duties were collected on a common frontier, and the revenue thus received

was divided among the several states according to population. Three unions were formed, the North German, the Middle German and the South German unions, and in 1834 these were merged in a single union, or Zollverein. In 1871, when the German Empire was formed, the constitution provided that the Zollverein was to include the entire empire, with the exception of the free cities of Bremen and Hamburg. Later these, too, with the exception of a part of Hamburg, were included.

ZONE, in geography, one of the five great divisions of the earth, bounded by imaginary circles, which are parallel to the equator. The zones are named according to the prevailing temperature in each. The torrid zone extends $23^{\circ} 30'$ north and $23^{\circ} 30'$ south of the equator, thus being 47° wide. It is bounded on the north by the Tropic of Cancer and on the south by the Tropic of Capricorn. The north temperate zone extends from the Tropic of Cancer to the Arctic Circle and is 43° wide. The south temperate zone extends from the Tropic of Capricorn to the Antarctic Circle and is of the same width as the north temperate zone. The north frigid zone extends from the Arctic Circle to the North Pole, and the south frigid zone from the Antarctic Circle to the South Pole. While the parallels named mark the arbitrary boundaries of these zones, the climate of each merges so gradually into that of the zones adjoining upon either side, that no distinct climatic boundary exists between them.

Related Articles. Consult the following titles for additional information:

| | |
|------------------|-----------|
| Antarctic Circle | Equator |
| Arctic Circle | Geography |
| Climate | Tropics |

ZOOLOGICAL, *zo o loj'i cal*, **GARDEN**, a park or other large enclosure where live animals are kept for exhibition. The Jardin des Plantes, in Paris, founded in 1804, was the first of such establishments, and the number has increased steadily, until at present many of the large cities in Europe and the United States maintain zoölogical collections of some sort. The gardens at London, Antwerp, Berlin, Vienna and Amsterdam are among the best in Europe. Most of the European collections are maintained by societies or corporations, the city merely furnishing the land. In the United States many cities have municipal "zoos," that at Bronx Park, New York City, being the largest and

finest in the world. The zoos of Lincoln Park, Chicago, and Highland Park, Pittsburgh, are also important, and Philadelphia, Cincinnati and Washington have well-equipped zoölogical gardens. The National Zoölogical Park at Washington is under the control of the Smithsonian Institution and is supported by the government.



ZOOLOGY, *zo ol' o jy*. We are all interested in animals, and like to watch them and to learn about their habits; but it does not often occur to us that such an interest has any connection with a science with so forbidding a name as zoölogy. And indeed zoölogy is much more than a knowledge of the looks and the habits of animals; in its various branches it considers the form and structure of organisms, their activities and their relations to

one another and to their surroundings.

To be sure, one may be happy and prosperous and fairly well equipped mentally if zoölogy be never studied, but certain facts relating to this science should be known by everyone. An elementary knowledge of the subject will save one from frequent embarrassment. For instance, if the statement be made that a whale and a man belong to the same class of animals, the uninformed person may be tempted to deny the fact. The household cat and the lion, king of beasts, are related, and only a little study is required to trace the relationship and to learn why scientists so classify them.

The fact of these relationships has not always been known even to scientists; indeed, it is only in comparatively recent times that exact classifications of animal life have been made. Far back in ancient times, Aristotle made studies of animal life, dissected specimens, and made a certain classification, and his work stood for the most part unquestioned until after the Middle Ages. Some of it is accepted to-day, modern scientific investigation having confirmed the theories of the old Greek scholar.

Plants and Animals. The word *biology* means *science of life*, and the science of

biology treats of all forms of life, plant and animal. The fact that this one science of life is composed of two distinct sciences, one of which—botany—treats of plants, while the other—zoölogy—treats of animals, indicates that the two forms of life are distinct. Indeed, it seems to be a very simple matter to distinguish members of the plant world from animals. Usually it is easy; a bee on a flower, an ox grazing in a field of grass, a moth fluttering on a blossom are instantly classified. But there are among plants some with very simple organisms and among the lowest species of animals some whose organisms are not in the least complex; to tell which is plant and which is animal is difficult indeed. One may say that the animal is alive and can move, while the plant, though alive, has no power of motion. This is an error, as witness the sudden closing of the Venus's fly-trap (which see), when it entraps its food, the turning of some flowers so they will continually face the sun, and the twining of tendrils around sticks and strings. Most green plants live on inorganic matter—on carbon and carbonic acid gas—and this is what gives them their greenness. But some plants, the fungi, live on organic matter and are not green, and exist because they are able in a wonderful manner to change the organic matter they select for food into inorganic substance. When a plant substance is single-celled and has cell walls in many respects like those of single-celled animals, it is impossible for the wisest scientist to tell them apart.

What All Animals Need. A fish that has been taken from the water and left high and dry on the shore will not live long; a cat or a bird or a man will die in even shorter time if held under water. This does not mean, however, that a fish and a land animal breathe different substances—that one breathes water and the other breathes air. They both require the same substance, and cannot live without it; that substance is air. But a fish is so formed that it draws the air it needs from the water, which a land animal cannot do. No animal, from the lowest to the highest, can live without air, or rather without that element of air which is called oxygen.

Relationships. Earlier in this discussion brief reference was made to some of the odd relationships that exist in the animal world. This is one of the most interesting topics with which zoölogy deals. The word *cat* ordinarily



THE DOG FAMILY

1. Saint Bernard. 2. Fox terrier. 3. Fox. 4. Coyote. 5. Wolf.

means to us the little animal, gray or white or black, which plays about our homes; but after we have made the acquaintance of this science, the word *cat* gains a new meaning. It means the powerful lion, the lithe tiger, the graceful leopard, the sharp-eyed lynx—all wild, ferocious beasts that seem as different as possible from the household pet which we are used to thinking of as the most domestic of the animals. (See illustration, page 721).

The dog family is not so surprising. The wolf, the dog, the fox, the coyote look much alike, despite their numerous points of difference. If we can imagine ourselves as never having seen any of the animals before and then as being shown a wolf, a collie and a little black-and-tan, we will admit that we

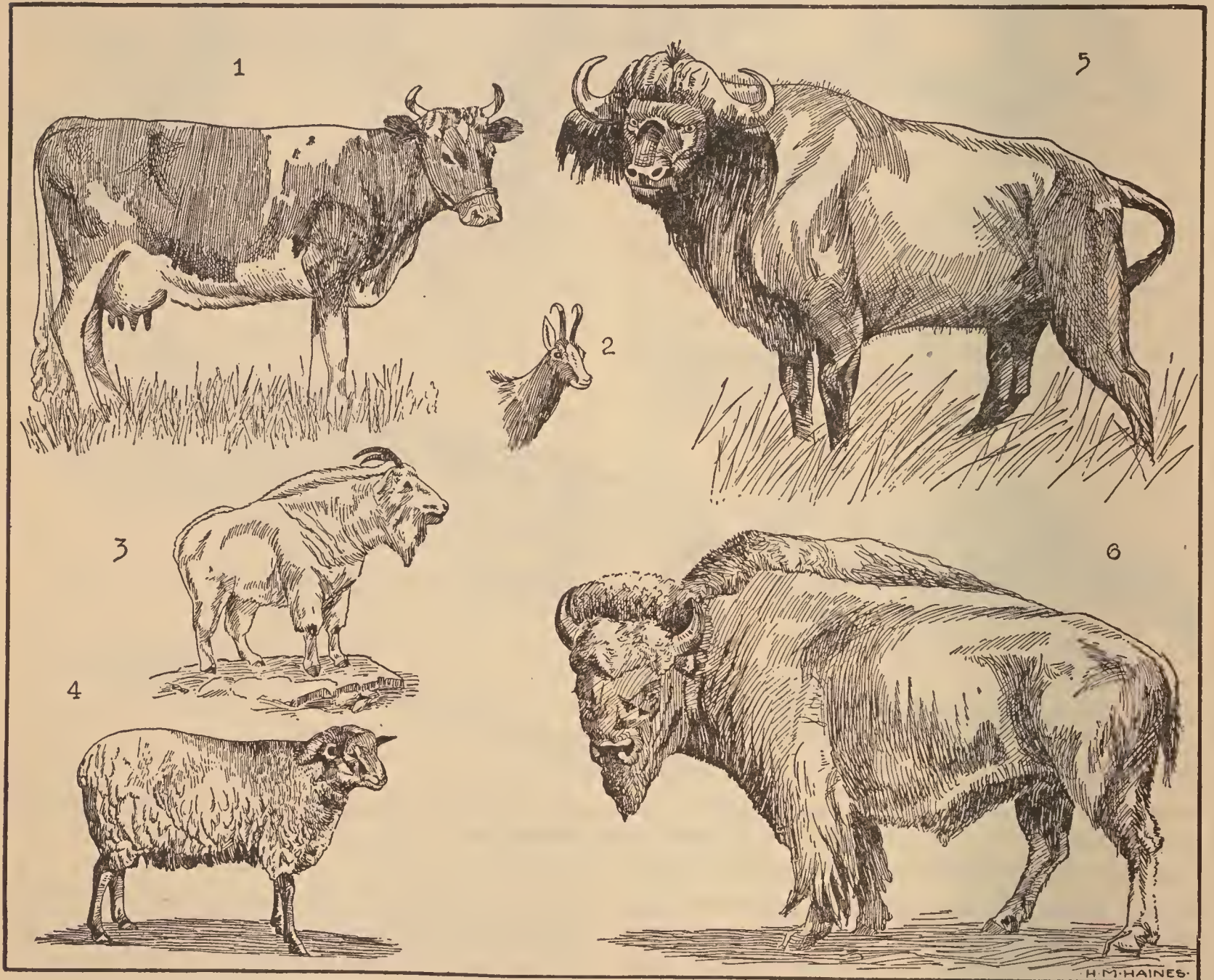
should be likely to assume that the wolf and the collie were more closely related than the collie and the little terrier. We have all watched cattle and sheep grazing in a field, but it has probably never occurred to any of us to think of them as belonging to the same family. And yet a study of the picture of the dog family, shown in this article, proves not only these animals belong to the ox family, but the goats, buffalo and the bison of our western plains as well.

The bobwhite is a plain little bird, dressed in quiet colors. Who would ever suspect for a moment that he belongs to the same family as the great bronze turkey or the gorgeous peacock? He may, however, claim such a relationship; and the guinea fowl, the partridge and our barnyard hens and roosters

are members of the same family, together with the bird which has given its name to the whole group—the pheasant.

Resemblance. Among the most interesting of the many wonderful facts about the animal world with which zoölogy acquaints us is what is known as resemblance or mimicry. We have perhaps looked, in a zoölogical garden, at the bears—the grizzly bear, the cinnamon bear, the polar bear; and

he ever be able to come close to his prey unobserved? But the polar bear harmonizes with his surroundings, and is almost unnoticeable against the white background. In the forest regions or mountain regions a white bear could be seen a long way off, while the darker-haired animals are much less conspicuous. The foxes and hares of the polar regions are pure white also, while a certain kind of weasel which lives in a region where



THE OX FAMILY

1. Cow. 2. Head of antelope. 3. Rocky Mountain Goat. 4. Sheep. 5. African buffalo. 6. Bison, or American buffalo.

we have known that the polar bear came from the arctic regions where snow covers the ground during most of the year, while the other bears come from more temperate regions—regions of forest and rock and mountain. But probably it never occurred to us that there was any particular reason for the differences in color.

Let us imagine, in the region of perpetual snow, a bear creeping upon his prey. He is a huge bear, and stands out with startling distinctness against the white ground. Would

snow covers the ground during only a part of the year changes from its summer coat of reddish brown to a winter coat of white. See **FUR AND FUR TRADE.**

There is one example of this changing of colors with which we are all familiar; that is in the little lizard which we call the chameleon. Its ability to make its color match that of its surroundings is commonly overestimated—it cannot change to any or every color; but it does grade through various shades of brown and green.

Questions on Zoölogy

NOTE—For additional questions on animal life refer to *Nature Study*. In that department will also be found interesting outlines on animals, birds, fish, insects, etc.

What is zoölogy?

What is the derivation of the term zoölogy?

What does "cold-blooded" signify when applied to animals?

What are the difficulties of classification in the case of the lowest forms of animal life?

What are the causes of the migratory habit of animals?

Which are the more abundant, the higher or lower forms of life? Why?

What animal is born without a covering? Why?

What are the most useful animals to man for domestic purposes?

What animals are known as ruminants?

What parts of the deer are of commercial value?

How are flesh-eating animals equipped to eat their food? To obtain it? They are satisfied with one meal at a time, eaten rapidly; why?

Why does live stock have to graze so continuously?

What is the difference between an animal and a plant?

Name some of the many ways in which nature has provided for the safety and preservation of wild animals?

What animals produce the most expensive furs?

What do you mean by vertebrates?

In general, what one part of wild animals is of commercial value?

Name the domestic animals in what you think to be the order of their usefulness.

Perhaps the most wonderful of these resemblances are shown among the insects. There is the insect known as the walking-stick, which, with its long, slender wingless body and its dull color looks so like a dead twig that when at rest it cannot be distinguished from the twigs to which it attaches

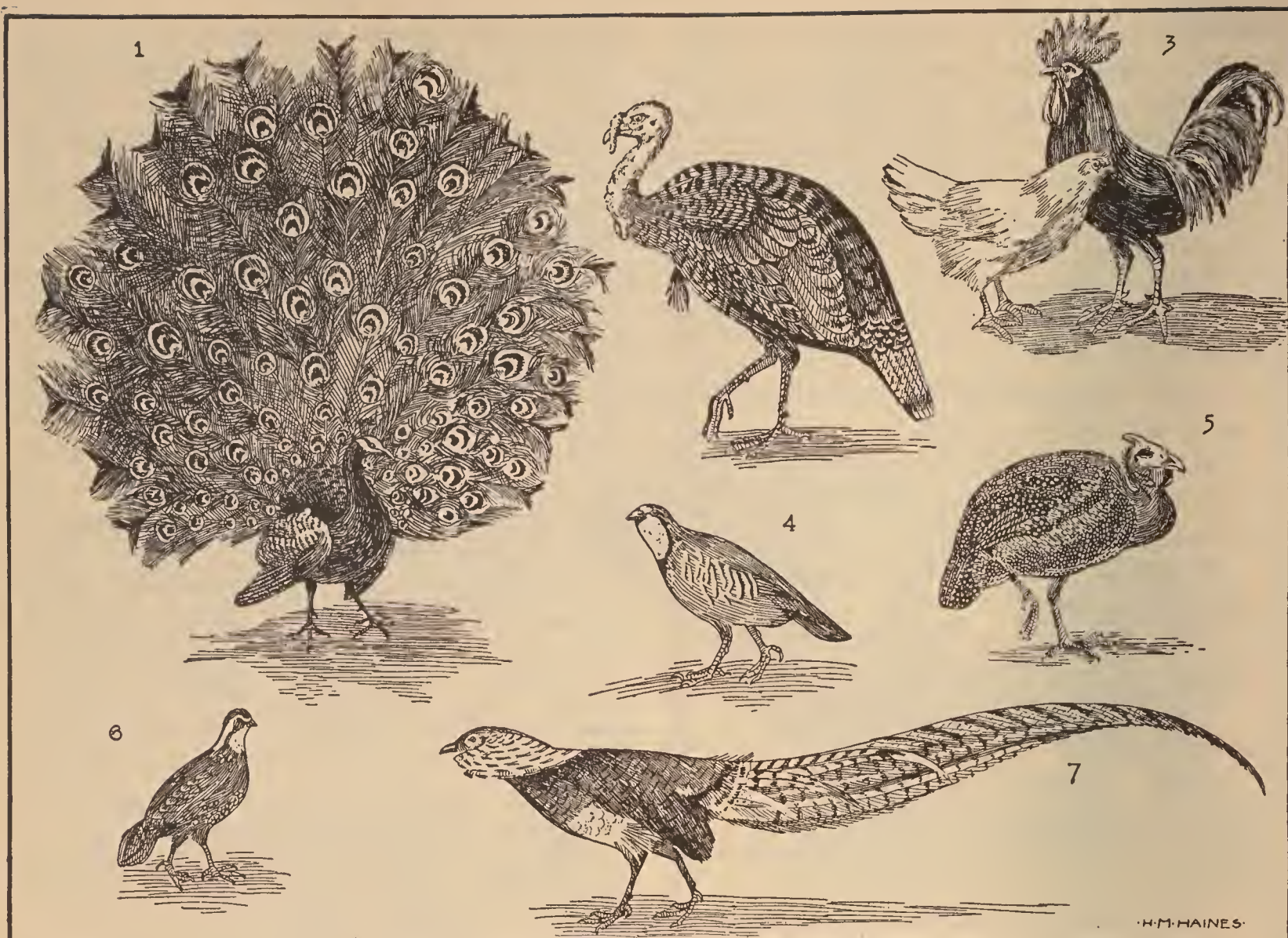
itself; there is the greenleaf insect, which has broad, leaf-green wings, which show the veins, the markings and even the discolorations of leaves; and most wonderful of all, there is the huge dead-leaf butterfly. The upper side of this remarkable butterfly's wings are dark, with orange and purple markings; but when it settles on a branch to rest it folds its wings close over its back, hides its head, and looks so exactly like a withered leaf that even close scrutiny cannot always distinguish it. The dead-leaf color is there, the short tail which looks exactly like a leaf stalk, the midrib, the veins, and even the two colorless spots which resemble holes eaten out by insects.

There is one other type of resemblance or mimicry. This is seen in the case of the harmless, non-poisonous insects which imitate exactly in their color and markings certain poisonous insects which really differ from them widely. By this mimicry the harmless insects are saved from the birds which would otherwise devour them.

Protective Coloration and Mimicry.

When we use the words mimicry and resemblance, we must constantly bear in mind one fact: that is, that there is no consciousness, no intention on the part of the mimic. The insect or animal does not voluntarily imitate.

The Struggle for Existence. If all the animals that are born were to live, in a very short time the earth would be crowded to suffocation. For instance, it is stated that if all the eggs laid by the conger-eel were hatched, and every little eel grew and reproduced itself, it would take less than ten years for the sea to become solidly full of conger-eels. It is clear that only a small proportion of the animals born survive. So fierce, indeed, is the struggle, that it is usually only by means of superior strength, cunning or agility or by means of some special protective device, such as the mimicry spoken of in the last paragraph or poisonous secretions, that animals can live and thrive. First there is the struggle within the species—fox fights against fox, and the stronger wins. Then there is the struggle with animals of other species, and finally with the conditions of life, or forces of nature. If in any given locality, only enough food exists for a certain number of animals, all above that number must starve or migrate. Innumerable birds, insects, fish, animals of all species die of starvation; many die from climatic condi-



THE PHEASANT FAMILY

1. Peacock. 2. Turkey. 3. Domestic hen and rooster. 4. Partridge. 5. Guinea fowl.
6. Bob white. 7. Golden pheasant.

tions; in settled parts of the country many are killed by man. By all of these means the animal population of the world is kept down. In most districts which are uninhabited, the number of a certain species of animals remains nearly constant; where man joins his destructive forces with those of Nature, the forms of wild life diminish rapidly.

Related Articles. Consult the following titles for additional information:

| | |
|------------------------|-----------------------|
| Amphibians (with list) | Invertebrates |
| Animal | Lamarck, Jean |
| Animal Intelligence | Baptiste |
| Arachnida | Linné, or Linnaeus |
| Arthropoda | Larva |
| Birds (with list) | Mammals (with list) |
| Carnivora | Marsupials |
| Cell | (with list) |
| Cephalopoda | Metamorphosis |
| (with list) | Mollusca (with list) |
| Cetacea (with list) | Molting |
| Chiroptera | Myriapoda |
| Coelenterata | Neuroptera |
| Crustacea (with list) | Orthoptera |
| Cuvier, George L. | Primates (with list) |
| Darwin, Charles | Protective Coloration |
| Echinoderms | and Mimicry |
| Edentata (with list) | Protoplasm |
| Egg | Protozoa |
| Evolution | Radiolaria |
| Feathers | Reptiles (with list) |
| Fish and Fisheries | Rodents |
| (with list) | Ruminants |
| Hemiptera | Scales |
| Hibernation | Ungulates |
| Horn | Vertebrata |
| Infusoria | Vorticella |
| Insectivora | Worms |
| Insects (with list) | Zoölogical Garden |

Outline on Zoölogy. The following outline contains the classification of animals generally accepted by the leading authorities during the past half century, or thereabouts. It has divided the animal kingdom into seven subkingdoms; each of these is divided into families; the families are divided into genera and the genera into species. The subkingdoms are distinguished by bold-faced type and Roman numerals.

I. **Protozoa** (first animals)

- (1) Monera (single + substance)
- (2) Rhizopoda (from two Greek words meaning "root" and "foot")
- (3) Foraminifera (having an opening or orifice)
- (4) Radiolaria (so called because of the spiny projections which radiate from the center of the body)
- (5) Infusoria (so called because found in infusions after even brief exposure to air)

II. **Coelenterata** (hollow intestines)

- (1) Medusae (so called because of the fringe supposed to resemble Medusa's locks)
- (2) Polyp (polypus meaning many-footed)
 - (a) Sponge
 - (b) Coral
 - (c) Sea anemone

III. Worms

- (1) Platyhelminthes (flat + worm)
 - (a) Flat-worm
 - (b) Tape-worm
 - (c) Fluke-worm
- (2) Nematelminthes (thread + worm)
- (3) Star-worms
- (4) Annulata (so called because of the ringed markings)
 - (a) Leech
 - (b) Earth-worm
 - (c) Sea-worm

IV. Echinodermata (spring skinned)

- (1) Crinoidea (lily + like)
- (2) Star-fish
- (3) Sea urchin
- (4) Sea cucumber

V. Mollusca (soft body-red animals)

- (1) Bivalves
 - (a) Oyster
 - (b) Clam
 - (c) Mussel
 - (d) Scallop
- (2) Cephalophora (head + to bear)
 - (a) Whelk
 - (b) Snail
- (3) Cephalopoda (head + feet)
 - (a) Squid
 - (b) Cuttle-fish
 - (c) Nautilus
 - (d) Octopus

VI. Arthropoda (jointed-foot animals)

- (1) Crustacea
 - (a) Water-flea
 - (b) Shrimp
 - (c) Lobster
 - (d) Crab
 - (e) Barnacle
- (2) Myriopoda (numberless feet)
 - (a) Millipede (thousand feet)
 - (b) Centipede (hundred feet)
- (3) Arachnida (from the Greek word for spider)
 - (a) Spider
 - (b) Scorpion
 - (c) Mite
 - (d) Tick
- (4) Insects
 - (a) Thysanura (fringe tail)
 - (b) Dermaptera (skin + wings)
 - (c) Orthoptera (straight wings)
 - (1) Grasshopper
 - (2) Locust
 - (3) Cricket
 - (4) Katydid
 - (5) Cockroach
 - (d) Platyptera (flat + wing)
 - (1) White ant
 - (2) Bird-lice
 - (3) Bookworm
 - (e) Hemiptera or bugs half or semi + wing)
 - (1) Louse
 - (2) Squash bug
 - (3) Chinch bug
 - (4) Locust
 - (5) Cochineal (from the Latin word for scarlet)
 - (f) Neuroptera and allied groups (nerve + wing)

- (1) Dragon fly
- (2) May fly
- (3) Scorpion fly
- (4) Caddis fly

- (g) Beetles
- (h) Fleas
- (i) Diptera (two wings)
 - (1) Fly
 - (2) Mosquito
- (j) Lepidoptera (scaly wings)
 - (1) Butterfly
 - (2) Moth
- (k) Hymenoptera (membrane + wing)
 - (1) Bees
 - (2) Wasps
 - (3) Ants
 - (4) Gall-flies

VII. Vertebrata (animals having vertebrae or backbone)

- (1) Fishes
- (2) Amphibians (from the Greek word meaning "double life")
 - (a) Salamander
 - (b) Frog
 - (c) Toad
 - (d) Blindworm
- (3) Reptiles
 - (a) Lizards
 - (b) Snakes
 - (c) Turtles
 - (d) Crocodiles
- (4) Birds
(See detailed outline, page 455)
- (5) Mammals
 - (a) Duck-billed platypus
 - (b) Marsupialia (having a pouch)
 - (1) Opossum
 - (2) Kangaroo
 - (c) Edentata ("without teeth," but the term is misleading, as most of them have teeth)
 - (1) Sloth
 - (2) Ant-eater
 - (3) Armadillo
 - (d) Rodentia (gnawing)
 - (1) Rat
 - (2) Mouse
 - (3) Squirrel
 - (4) Porcupine
 - (5) Beaver
 - (6) Hare
 - (e) Insectivora (insect + to devour)
 - (1) Mole
 - (2) Shrew
 - (f) Chiroptera or bats (from words meaning hand and wing)
 - (g) Cetacea (from the Latin word for whale)
 - (1) Whale
 - (2) Porpoise
 - (h) Sirenia (i. e., sirens)
 - (1) Manatee
 - (2) Dugong (Malay word)
 - (i) Proboscidea or Elephants (before + to feed or graze)
 - (j) Ungulata (from ungula, a hoof)
 - (1) Odd number of toes
 - (a) Horse, ass, zebra
 - (b) Rhinoceros

Prôtôzôa—One-celled animals.

No definite shape; jelly-like substance; root-like projections of body for feet, with which they seize their prey and absorb it.

Coelënteräa—Many-celled.

- a. Simple organisms. Capture food by long tentacles. No distinct circulatory system or body cavity. Two types: Those bell-shaped and cylindrical.
- b. Examples: Sponge, anemone, coral, hydra, etc.

Echñoderäta. Sometimes called radiates.

- a. Consists of five parts around a center. Covering sometimes a hard shell; others soft and leathery. Alimentary canal separate from body cavity.
- b. 3,000 living species found in all seas—such as starfish, sea-urchin, etc.

Vërmës—Worms.

- a. Made up of joints or segments, head, tail, upper and lower surfaces, heart, nerves, etc.
- b. Many species, but all have same characteristics.

Mollüşca. Sometimes called shellfish.

- a. Possess alimentary canal, distinct nervous system, digestive apparatus, mouth, gullet, stomach, intestines.
- b. Examples: Oyster, clam, cuttlefish, etc.

Ärthröpöda. Sometimes called articulates.

- a. Possess well-organized nervous systems; usually have simple or compound eyes. Some species are parasites.
- b. Examples: Insects, spiders, lobster, crab, etc.

Vertebrates.

- a. Possess backbone. Two cavities: Upper containing brain; lower, heart, digestive organs, etc.
- b. Examples: Mammals, reptiles, fishes, birds, amphibians, etc.

General Facts

- 1. One-celled animals bear strong resemblance to lowest orders of plant life.
- 2. This simple cell has the power to do all things necessary for its life.
- 3. Higher formed animals have many cells, and whole sets of organs. These vary in different animals but their function is the same.
- 4. Animals require oxygen, while plants require carbonic acid.
- 5. Animal intelligence, Many animals possess the senses of man—touch, sight, etc. Higher animals possess memory. Animals draw inferences from what they see, but it is doubtful whether an animal can put together different facts and establish a conclusion.

ANIMALS

ZOOLOGY

- (2) Even number of toes
 - (a) Tapir
 - (b) Peccary
 - (c) Pig
 - (d) Hippopotamus
 - (e) Deer
 - (f) Sheep
 - (g) Ox and bison
 - (h) Camel
- (k) Carnivora (flesh + to devour)
 - (1) Aquatic
 - (a) Walrus
 - (b) Seal
 - (c) Sea lion
 - (2) Land
 - (a) Bear and racoon
 - (b) Mustelidae (from *mustela*, the Latin word for weasel)
 - (1) Otter
 - (2) Skunk
 - (3) Weasel
 - (4) Badger
 - (5) Mink
 - (c) Dog family
 - (1) Fox
 - (2) Wolf
 - (3) Dog
 - (d) Cat family
 - (1) Hyena
 - (2) Lynx
 - (3) Panther
 - (4) Leopard
 - (5) Tiger
 - (6) Lion
- (l) Primates (from the Latin *primus*, meaning first or highest)
 - (1) Lemur
 - (2) Marmoset
 - (3) Monkey
 - (4) Ape
 - (5) Man

ZORN, *tsorn*, ANDERS LEONHARD (1860–1920), a Swedish artist, famed as a landscape and portrait painter, etcher and sculptor. He was born at Mora, of peasant parents. Zorn expected at first to devote himself wholly to sculpture, and to that end studied in Stockholm for six years; subsequently he took up etching and water color painting in London. His first oil painting, *Fisherman from Saint Ives*, was purchased for the Luxembourg Museum in 1888. Zorn's fame steadily increased with time, as he showed genius in all phases of art which he undertook. He became a foremost portraitist, showed a mastery of the technique of sculpture, and won equal fame as an etcher. His portraits include *King Charles of Sweden*, a study of himself (in the Uffizi), *Maja* and *The Toast*. Among his etchings is a remarkable series of portraits, including studies of Renan, Strindberg, France, Rodin and other celebrities. Notable

pieces of sculpture include a statue of Gustavus Vasa, *Faun and Nymph* and *Grandmother*.

ZOROASTER, *zo ro as'ter*, a teacher and reformer of ancient Persia, who formulated one of the chief religious systems of the world. It is not definitely known when he lived, but it was probably between 660 and 583 B. C. Legend associates with his life such supernormal phenomena as miracles, symbolic dreams, visions and temptations by an evil spirit. His teachings are embodied in the Zend-Avesta, the sacred book of the Parsis and Guebers, his followers at the present time. They embrace the idea of conflicting forces of good and evil in the world, and man's power to choose between them. Good thoughts, good words and good deeds form the watchword of the faith.

ZOUAVES, *zwahvz*, or *zoo ahvz'*, originally a body of troops in the French army. It derived its name from a tribe of Kabyles inhabiting the mountain of Jurjura, in the Algerian province of Constantine. General Clausel, of the French army in Algiers, created, in 1830, two battalions of Zouaves, in which each company consisted of French and Zouaves in certain proportions, officers, subalterns and soldiers being selected from both. The zouaves, though retaining their Moorish dress, were armed and disciplined after the European fashion, and the battalions were recruited by voluntary enlistment.

The mixing of soldiers proved unsatisfactory, and after 1839 no more natives were recruited, though regiments of Algerian sharpshooters were formed of men of exceptional physique and courage. These regiments became an integral part of the French army, and won distinction not only in Africa, but also in the Crimea, Italy, Mexico, Tunis and Tongking. The Zouaves now in the French army are organized in three regiments of five battalions each, and are among the finest soldiers in Europe. A large force of these *Turcos*, as they are called, fought in the great war from 1914 to 1918.

In the United States during the Civil War some Northern regiments adopted the Zouave uniforms and were known as Zouaves. Most famous of these was a New York regiment, under the command of Colonel Ellsworth.

ZUIDER ZEE, *zi'der ze'*, a large, shallow arm of the North Sea, extending into the northwestern part of the Netherlands. The

reclamation of the land under the Zuider Zee and its transformation into a fertile province is one of the immediate projects of the Netherlands (see NETHERLANDS, pages 2512-'13). The inlet consists of an oval inner portion, a horn-shaped outer portion and a narrow strait connecting the two. The area is about 2,000 square miles. Originally the inner portion was a lake, situated in a region of fens and marshes. In the thirteenth century severe storms caused an inundation of the North Sea and the submergence of large sections of land.

ZULUS, *zoo'looz*, a warlike people of Bantu stock, inhabiting parts of South Africa. They support themselves chiefly by raising millet and breeding cattle. They live in thatched and plastered houses, supported by poles, which are beehive in form and arranged in large circles, enclosing the cattle pens. These communities, or villages, are called *kraals*. Pottery making, basket weaving, iron smelting and hide tanning are engaged in to a certain extent. The principal weapons are the assegai and the knobkirri. Polygamy and wife purchase are customary. Chaka, the chief ruler during the first quarter of the nineteenth century, dominated South Africa from the Zambezi to Cape Colony. Cetewayo reigned from 1874 to 1878, and by his depredations he embroiled his people in war with England. Dinizulu, his son, was crushed in 1879, but, as he continued to incite the natives to fighting, he was banished. The Zulus are gradually becoming civilized.

Zululand, *zoo'loo land*, a region of South-eastern Africa, forming a part of the British province of Natal, to which it was annexed in 1897. Its area is about 10,450 square miles, and its population is about 230,000, the most of whom are natives. See NATAL.

ZUNI, *zoo'nyee*, the popular name of a Pueblo Indian tribe which inhabits four pueblos, or villages, in New Mexico. The most important of these villages is also called Zuñi. The Zuñi, or Ashiwi, as they call themselves, have lived in the same locality for centuries; the Spanish explorers discovered them there in 1539, and missions were established later among them.

Zuñi is built about a central court, surrounded by a continuous high wall which is scaled by ladders on both sides, intended originally for defense. The entrances to the

houses are on the roofs; and these also are reached by ladders inside and out. The people number about 1,600. They support themselves by cultivating the soil and raising stock.

ZURICH, *zoo'riK*, SWITZERLAND, capital of the canton of Zurich and the largest city of the republic. It is on the Limmat, at the northern end of Lake Zurich, sixty miles northeast of Bern. The city is divided by the Limmat into two parts, known respectively as the Little City and the Great City. The old historical quarter of Zurich is picturesque, with its steep, narrow streets and quaint, dark houses, but the newer part of the city has handsome buildings and wide, attractive streets. Among the more noteworthy buildings are the old Wasserkirche, which now houses the municipal library; the old church known as the Grossmünster, of which Zwingli was pastor; the townhall, the university buildings and the Swiss national museum, the largest museum in Switzerland.

The educational institutions of the town include the university, with about 800 students, and the Federal Polytechnic, which has about 1,100 regular students, besides special students who attend lectures. Commercially and industrially, Zurich is of considerable importance. The silk industry is large, and cotton, paper and machinery are also manufactured. During the Middle Ages the town of Zurich was prosperous and important. It was the scene of the beginning of Zwingli's reformation. Population, 1910, 189,088; in 1918, estimated, 213,900.

ZURICH, LAKE, a lake of Switzerland, lying mostly within the canton of Zurich, but extending for a short distance into Schwyz and Saint Gall. It is about twenty-five miles in length and from one-half to two and one-half miles in width, and is somewhat in the shape of a crescent. Its scenery is picturesque and charming, although not so imposing as that of some of the other lakes of Switzerland.

ZUYDER ZEE, *zi'der ze'*. See ZUIDER ZEE.

ZWINGLI, *tswing'lee*, ULRIC or HULDREICH (1484-1531), an illustrious Swiss reformer. In 1506 he was ordained by the bishop of Constance, becoming in the same year pastor of the large parish of Glarus. His studies in the New Testament gradually led him to question many of the doctrines in which he had been trained, and by degrees he became known as an ardent reformer. as well as a

prominent patriot. He had no communication with Luther, but by 1516 he had begun a work in Switzerland very similar to that which had been started by the great German reformer. In 1522 he demanded of the bishop of Constance and all the governments of the confederation the abolition of the law imposing celibacy upon the priests, and his suggestions for one reform after another widened his breach with the Church.

In 1529 he went to Marburg, to confer with Luther and the other German reformers, upon the possibility of uniting the re-

form movements, that a stronger resistance might be made to their opponents. Zwingli was willing to make concessions, but Luther objected to the fact that the religious movement in Switzerland was allied with a movement for civil reform, and this, together with their differing views on the Lord's Supper, prevented coöperation. In 1531, when open war broke out between the Catholic and the Protestant cantons of Switzerland, Zwingli accompanied the Zurich regiment as chaplain and was killed at the Battle of Kappel.

COMPLETE INDEX

In the pages which follow there is printed a carefully compiled Index of all topics which are treated in this set of books.

In the minds of many people information regarding various phases of knowledge is contained only in special articles bearing black-face capital-letter headings. The general plan of THE EDUCATOR volumes provides the usual and familiar alphabetical arrangement of such titles. Every article bears such a heading, but there is a vast array of facts which, while of value, are not of themselves of sufficient moment to demand treatment in separate articles. Such bits of information are found in the body of discussions of thousands of related subjects, but they are not accessible on a moment's notice. There is needed, therefore, a system of reference which will disclose their positions in the volumes.

The present Index presents these very numerous subjects by page numbers, and points to the column where information regarding them will be found. The letter *a* after a number indicates the location of a fact in the first column of the page; the letter *b* locates it in the second column.

COMPLETE INDEX

A

- A, 1a, 2681b.
 A, (in music), 1a.
 A1, Aal and AA1, 1a.
 Aachen, 1a, 56a.
 Aard-vark, 1a.
 Aard-wolf 1b.
 Aaron, 1b.
 Abacus, 2a.
 Abalone, 2a.
 Abbey, 2a.
 Abbey, Edwin Austin, 2b.
 Abbot, 2b.
 Abbotsford 2b, 3227a.
 Abbot, Jacob, 2b.
 Abbott, John Joseph Caldwell, 3a.
 Abbott, Lyman, 3a.
 Abbreviations, 3b.
 Abdication, 5a.
 Abdomen, 5a.
 Abd-ul-Hamid II, 5b.
 Abel, 6a.
 Abelard, Pierre, 6a.
 Abercrombie, James, 6a.
 Aberdeen, John Campbell Gordon, 6a.
 Aberdeen, Scotland, 6b.
 Aberdeen, S. D., 6b.
 Aberdeen, Wash., 6b.
 Aberdeen-Angus Cattle, 728b.
 Aberration, 7a.
 Abigail, 7a.
 Abilene, Tex., 7a.
 Abiogenesis, 3390a.
 Abolitionists, 7b.
 Abomey, 7b.
 Abominations, Tariff of, 3516a.
 Aborigines, 288b.
 Aboukir, 7b.
 Abraham, 7b, 406a.
 Abrasives, 8a.
 Abruzzi, Prince Luigi Amadeo, 8a.
 Absalom, 8a.
 Absalom and Achitophel, 1147a.
 Abscess, 8a.
 Absinthe, 8b, 3947a.
 Absolute Monarchy, 2382a.
 Absolution, 8b.
 Absorbents, 8b.
 Absorption, 8b.
 Abstraction, 9a.
 Abu-Abdul-lah, 479b.
 Abu-bekr, 9a, 155b, 2376b.
 Abukir, 7b.
 Abutilon, 9a.
 Abydos (Asia Minor), 9a.
 Abydos (Egypt), 9a.
 Abyssinia, 9b.
 Acacia, 11a.
 Acacia Seyal, 3286b.
 Academus, 11a.
 Academy, 11a.
 Acadia, 11b, 1279a, 2616a.
 Acanthus, 11b.
 Accent, 11b, 2683b.
 Acclimatization, 12a.
 Accolade, 808b.
 Accordion, 12a.
 Accounting, 12b.
 Acetanilid, 13a.
 Acetates, 13a.
 Acetic Acid, 13a.
 Acetylene, 13a.
 Achaeans, 13b.
 Achates, 14a.
 Achilles, 14a, 1763b.
 Achroite, 3602b.
 Acid, 14a.
 Acilic Line, 14b.
 Aconcagua, 14b.
 Aconite, 14b.
 Acoustics, 14b.
 Acre, 14b.
 Acropolis, 15a.
 Acrostic, 15a.
 Actaeon, 15a.
 Actinism, 15b.
 Action, 3873a.
 Actium, 15b.
 Act of Union, 3669a.
 Acts of the Apostles, 15b.
 Adam and Eve, 15b.
 Adam Bede, 1213b.
 Adam's Apple, 2061a.
 Adams, Charles Francis, 16a.
 Adams, Charles Francis, Jr., 16a.
 Adams, Charles Kendall, 16a.
 Adams, Henry, 16a.
 Adams, John, 16b.
 Adams, John Quincy, 16b.
 Adams, Mass., 22a.
 Adams, Maud Kiskadden, 22a.
 Adam's Needle, 3972b.
 Adams, Samuel, 22a.
 Adams, William Taylor, 22b.
 Addams Jane, 22b, 1734b.
 Addax, 23a.
 Adder, 23a.
 Adding Machines, 635b.
 Addis Abeba, 23b.
 Addison, Joseph, 23b.
 Addition at Sight, 179a.
 Address, Forms of, 23b.
 Ade, George, 24a.
 Adelaide, South Australia, 24b.
 Aden, 24b.
 Aden, Gulf of, 24b.
 Adenoids, 24b.
 Adepts, 75b.
 Adhesion, 25a.
 Adipose Tissue, 921b.
 Adirondack Mountains, 25a.
 Adjective, 25b, 2050b.
 Adjutant (bird), 25b.
 Adjutant (military), 25b.
 Adjutant-General, 25b, 225b.
 Adler, Felix, 26a.
 Admetus, 26a, 75b.
 Administrative Law, 2067a.
 Administrator, 26b.
 Admirable Crichton, 987a.
 Admiral, 26b.
 Admiral of the Navy, 1068a.
 Admiralty, 27a.
 Admiralty Court of Canada, 27a.
 Adobe, 27a.
 Adolescence, 27b.
 Adonais, 1934a.
 Adonis (botany), 27b.
 Adonis (mythology), 27b.
 Adoption, 28a.
 Adrian (Popes), 28a.
 Adrian, Mich., 28a.
 Adrianople, Peace of, 3652b.
 Adrianople, Turkey, 28a.
 Adriatic Sea, 28b.
 Adulteration, 28b.
 Ad valorem Duties, 1011b.
 Adventists, 29a.
 Adverb, 29b.
 Advertising, 29b.
 Adventures of Sherlock Holmes, 1110a.
 Adz, 30a.
 Aegean Sea, 30a.
 Aegis, 30a.
 Aeneas, 30a.
 Aeneid, 30b, 3756a.
 Aeolus, 31a.
 Aerial Bridge, 557a.
 Aerostatic Press, 31a.
 Aeschines, 31a.
 Aeschulapius, 31b.
 Aeschylus, 31b.
 Aesir, 2461b.
 Aesop, 32a.
 Aetna, 1265a.
 Affidavit, 32a.
 Affinity (chemistry), 32a.
 Affinity (relationship), 3045a.
 Affirmation, 2627b.
 Afghanistan, 32b.
 Afghan War, 1784a.
 Africa, 33b.
 African Methodist Episcopal Church, 42b.
 Agamemnon, 42b, 1763a, 1829a, 2458a.
 Agaric, 42b.
 Agassiz, Alexander, 42b.
 Agassiz, Louis John Rudolph, 43a.
 Agassiz, Mount, 43a.
 Agassiz Association, 43b.
 Agate, 43b.
 Agave, 43b.
 Age (law), 43b.
 Agent, 44a.
 Age of Ice, 1514b.
 Age of Man, 44a.
 Age of Pericles, 271a.
 Age of Reason, 2701a.
 Agincourt, 44b.
 Aglaia, 1543b.
 Agnomen, 2467a.
 Agnosticism, 44b.
 Agnostics, 1527b.
 Agnus Dei, 44b.
 Agouti, 44b.
 Agra, 45a.
 Agraphia, 144a.
 Agrarian Laws, 45a.
 Agricola, Gnaeus Julius, 45a, 3497a.
 Agriculture, 45b.
 Agriculture, Department of, 50b.
 Agricultural College, 51b.
 Agricultural Colleges, Canadian, 51b.
 Agricultural Experiment Stations, 52a.
 Agriculture in the United States, 3682a.
 Agrimony, 52a.
 Agrippina, 2507a.
 Agua, 9b, 2229a.
 Aguadiente, 2896b.
 Aguas Calientes, Mexico, 52b.
 Aguinaldo, Emilio, 52b, 2819a.
 Agulhas, Cape, 53a.
 Ahab, 53a, 419a.
 Ahasuerus, 53a, 424a.
 Ahaz, 53a.
 Ahaziah, 53a.
 Ahmed Mirza, 2796a.
 Aida, 53a, 3755a.
 Aid-de-Camp, 53a.
 Ainmiller, Max Emanuel, 53b.
 Aino, 53b.
 Air, 53b.
 Air, Dephlogisticated, 2695b.
 Air Brake, 54a.
 Air Cells, 54b.

The letter a. after a number. indicates column 1; the letter b, column 2.

- Air Compressor, 54b.
 Airedale, 54b.
 Air Engine, 55a.
 Air Gun, 55a.
 Air Plants, 55a.
 Air Pump, 55a.
 Aisne, Battles of the, 56a, 3915b, 3917b.
 Aisne River, 56a.
 Aix-la-Chapelle, Congress of, 56b.
 Aix-la-Chapelle, Germany, 56a.
 Aix-la-Chapelle, Treaties of, 56b.
 Ajaccio, Corsica, 966b.
 Ajax, 56b.
 Akka, 57a.
 Akri, 15b.
 Akron, Ohio, 57a.
 Alabama, 57b.
 Alabama, The, 62a.
 Alabama, University of, 62b.
 Alabama River, 62a.
 Alabaster, 62b.
 Aladdin, 62b.
 Alameda, Calif., 63a.
 Alamo, The, 63a, 3183a.
 Aland Islands, 63b.
 Alaric I, 63b, 1540a.
 Alaric II, 63b.
 Alaska, 64a, 3044b.
 Alaska Sable, 3320b.
 Alaska-Yukon-Pacific Exposition, 68b.
 Albacore, 3645a.
 Albania, 69a.
 Albany, Ga., 69a.
 Albany, N. Y., 69b.
 Albany Convention, 70a.
 Albatross, 70b.
 Albemarle Sound, 71a.
 Albert Edward Nyanza, 74b.
 Albert I, 71a.
 Albert Nyanza, 74b.
 Alberta, 71b.
 Albigenses, 74b.
 Albinos, 74b.
 Albion, 744b.
 Albumen, 74b.
 Albuminoids, 1096b.
 Albuquerque, N. M., 75a.
 Alburnum, 75a.
 Alcazar, 3263b.
 Alcestis, 75b.
 Alchemy, 75b.
 Alcibiades, 75b.
 Alcohol, 76a, 139a.
 Alcoholism, 76b.
 Alcoran, 1993b.
 Alcott, Amos Bronson, 77a.
 Alcott, Louisa May, 77a, 3026a.
 Alcione, 2872b.
 Alden, Henry Mills, 77a.
 Alden, Isabella McDonald, 77b.
 Alden, John, 77b, 976b.
 Alder, 77b.
 Alderman (politics), 77b, 829a, 2434a.
 Alderman, Edwin Anderson, 78a.
 Alderney, 78a.
 Aldershot, Eng., 78a.
 Alder Tannin, 3512a.
 Aldrich, Nelson Wilmarth, 78a.
 Aldrich, Thomas Bailey, 78b.
 Ale, 78b.
 Aleppo, 78b.
 Aleutian Islands, 78b.
 Aleuts, 79a.
 Alewife, 79a.
 Alexander (Popes), 79a.
 Alexander, Prince (Serbia), 3258b.
 Alexander (Scottish kings), 79b.
 Alexander I, 79b.
 Alexander II, 79b, 3143a.
 Alexander III, 80a, 3143a.
 Alexander the Great, 80a.
 Alexandra (Queen), 81b.
 Alexandria, Egypt, 82a.
 Alexandria, La., 82b.
 Alexandria, Va., 82b.
 Alexandrian Age, 82b.
 Alexandrian Library, 83a.
 Alfalfa, 83a.
 Alfalfa Weevil, 3842b.
 Alfieri, Vittorio, 84b.
 Alfilaria, 1491a.
 Alfonso XIII, 84b, 3374b.
 Alfred the Great, 85a.
 Algae, 85b.
 Algarrobin, 1158b.
 Algebra, 85b.
 Algeciras, 93a.
 Alger, Horatio, 93a.
 Algeria, 93a.
 Algiers, Algeria, 94a.
 Algoa Bay, 94a.
 Algol, 94a.
 Algonkian System, 94b.
 Algonquian Indians, 94b.
 Algonquin Park, 94b.
 Alhambra, The, 95a, 1846a.
 Alias, 95a.
 Alice's Adventures in Wonderland, 95a, 1088b.
 Alien, 95a.
 Alien and Sedition Laws, 95b.
 Alimentary Canal, 95b.
 Alimony, 1086a.
 Alizarin, 95b.
 Alkali, 95b.
 Alkaloid, 96a.
 Allah, 96a.
 Allah, The Garden of, 1683a.
 Allahabad, India, 96a.
 Allan, Hugh Montagu, 96b.
 Alleghany Mountains, 96b.
 Allegheny River, 96b.
 Allegory, 97a.
 Allen, Ethan, 97a, 3579a.
 Allen, Florence E., 97a.
 Allen, Grant, 97b.
 Allen, James Lane, 97b.
 Allentown, Pa., 97b.
 Alliance, O., 98a.
 Alligator, 98a.
 Alligator Pear, 98a.
 Alligator-snapper, 3331b.
 Allison, William Boyd, 98b.
 Alliteration, 99a.
 Allopathy, 99a.
 Allotropy, 99a.
 Alloy, 99b. of steel, 3418b.
 All-Saints' Day, 99b.
 All-Souls' Day, 99b.
 Allspice, 99b, 2853b.
 Allston, Washington, 100a.
 Alto, 3311b.
 Alluvial Plain, 2864b.
 Alluvium, 100a.
 Alma Mater, 100a.
 Almanac, 100a.
 Almandine, 100b.
 Alma-Tadema, Lawrence, 101a.
 Almond, 101a.
 Aloe, 101a.
 Aloes Wood, 101b.
 Alpaca, 102a.
 Alpena, Mich., 102a.
 Alpha and Omega, 102a.
 Alphabet, 102b.
 Alps Mountains, 103a.
 Alsace-Lorraine, 103b, 1390a.
 Alsike, 860b.
 Altai Mountains, 104b.
 Altdorf, Switzerland, 104b.
 Altgeld, John Peter, 104b.
 Alton, Ill., 105a.
 Altona, Germany, 105a.
 Altoona, Pa., 105a.
 Alto Relief, 1219b.
 Alto-Relievo, 105b.
 Altruism, 105b, 1186b.
 Alum, 105b.
 Alumina, 105b.
 Aluminum, 106a, 767b.
 Aluminum Bronze, 570a.
 Alum Root, 106b.
 Alva, Ferdinand Alvarez de Toledo, 106b.
 Alverstone, Lord, 107a.
 Amadis of Gaul, 3371b.
 Amalgam, 107a.
 Amana Society, 107a.
 Amaranth, 107b.
 Amarillo, Tex., 107b.
 Amaryllis Family, 107b.
 Amati Family, 107b.
 Amazon River, 108a.
 Amazons, 108b.
 Ambassador, 108b.
 Amber, 109a.
 Ambergris, 109a, 3856b.
 Amber Mica, 2661b.
 Ambrogio di Bon Doni, 1513b.
 Ambrose, Saint, 109a.
 Ambrosia, 109a.
 Ambulance, 109b.
 Amendment, 109b.
 Amendments to the Constitution, 933a.
 America, 110a.
 America (hymn), 110a.
 American Association for the Advancement of Science, 110b.
 American Beauty, 110b.
 American Fabius, 1290a.
 American Flag, Story of the (outline), 3558b.
 American Goldfinch, 110b.
 Americanisms, 111a.
 American Legion, 112a.
 American Lion, 2726b.
 American Literature, 2121b.
 American Party, 2890a.
 American Rugby, 1368b.
 American Red Cross, 3035b.
 American University, 112a.
 Americus, Ga., 112a.
 Americus Vesputius, 112b.
 Amethyst, 112b, 461a.
 Amharic, 9b.
 Amherst, Nova Scotia, 112b.
 Amherst College, 112b.
 Amiens, France, 113a.
 Ammon, 113b.
 Ammonia, 113b, 139a.
 Ammonite, 113b.
 Ammonium, 113b.
 Ammunition, 113b.
 Amnesty, 114a.
 Amnon, 113b.
 Amoeba, 114a.
 Amos, 114b.
 Amoy, China, 114b.
 Ampere, Andre Marie, 114b.
 Amphibians, 114b, 1419b.
 Amphibole, 1720a, 2506a.
 Amphibrachic Meter, 2311b.
 Amphictyonic Council, 115a.
 Amphion, 115a.
 Amphitheater, 115a.
 Amputation, 115b.
 Amritsar, India, 115b.
 Amsterdam, Netherlands, 115b.
 Amsterdam, N. Y., 116a.
 Amulet, 116a.
 Amundsen, Roald, 116b, 2606a, 3366b.
 Amu River, 116a.
 Amur River, 116b.
 Amylopsin, 2725b.
 Anabaptists, 117a.
 Anabasis, 3955b.
 Anaconda, 117a.
 Anaconda, Mont., 117a.
 Anacreon, 117a.
 Anacreon in Heaven, 3407a.
 Anaemia, 117a.
 Anagram, 117b.
 Analysis, 117b, 2280a.
 Analytical Geometry, 2280a.
 Ananias, 118a.
 Anarchism, 3335a.
 Anarchists, 118a.
 Anatolia, 3650a.
 Anatomy, 118a.
 Ancestor Worship, 118b.
 Anchor, 118b.
 Anchovy, 119a.

- Ancient History, 1694a.
 Ancient Mariner, Rime of the, 71a, 119a, 878b.
 Ancient Order of United Workmen, 119a.
 Ancient Rome, 3096a.
 Ancient Theaters, 3555b.
 Andalusia, 3741a.
 Andamans, 119b.
 Andersen, Hans Christian, 119b.
 Anderson, Ind., 120a.
 Anderson, Marie Antoinette, 120a.
 Anderson, Robert, 120a.
 Anderson, S. C., 120a.
 Andersonville, Ga., 120b.
 Andes Mountains, 120b.
 Andorra, Republic of, 121a.
 Andover, Mass., 121b.
 Andre, John, 121b.
 Andree, Salomon August, 121b.
 Andrew, 122a.
 Andrews, Elisha Benjamin, 122a.
 Andromache, 122a.
 Andromeda, 122a.
 Andros, Edmond, 122b, 757b.
 Androscoggin River, 122b.
 Anemograph, 122b.
 Anemometer, 122b.
 Anemone, 123a.
 Aneroid Barometer, 345a.
 Anesthetic, 123a.
 Angel, 123b.
 Angel Fish, 123b.
 Angelico, Fra, 124a.
 Angell, James Burrill, 124a.
 Angelus, 124b, 2341b, 2707b.
 Angina Pectoris, 124b.
 Angiosperms, 124b, 517a, 518b.
 Angle, 125a.
 Angler, 125a.
 Angles, 125b.
 Angleworm, 1169b, 1467b.
 Anglican Church, 125b.
 Anglin, Margaret, 125b.
 Angling, 1334b.
 Anglo-Saxon Conquest, 3223b.
 Anglo-Saxons, 126a, 1236b.
 Angola, Africa, 126a.
 Angora, 126a.
 Angora Goat, 126a, 1527a.
 Anhalt, 126a.
 Anhydrite, 1603b.
 Aniline, 126a.
 Animal, 126b, 3339a.
 Animal Charcoal, 499a.
 Animal Industry, Bureau of, 51a, 3766a.
 Animal Intelligence, 127b.
 Animal Magnetism, 2307b.
 Animalcule, Bell, 3791a.
 Animals as Companions, 1977a.
 Anise, 128a.
 Anna (coin), 3134b.
 Anna Karenina, 3592a.
 Annam, 128a.
 Annapolis, Md., 128b.
 Annapolis Royal, N. S., 128b.
 Ann Arbor, Mich., 128b.
 Annatto, 129a.
 Anne, Queen, 129a.
 Annealing, 129b.
 Anne of Cleves, 1672a.
 Annexation, 129b.
 Annie Laurie, 129b.
 Anniston, Ala., 130a.
 Annuals, 130a, 428b, 2788a.
 Annuity, 130b.
 Annunzio, Gabrielle d', 130b.
 Anode, 131a, 1206b.
 Anomalistic Month, 2404b.
 Anopheles Mosquito, 2229a, 2421b.
 Anorthite, 1307b.
 Ansonia, Conn., 131a.
 Ant, 131a.
 Ant, White, 3545a.
 Antaeus, 136a.
 Antakiyeh, 141a.
 Antananarivo, 136a.
 Antarctic Circle, 136b.
 Antarctic Ocean, 136b.
 Ant-eater, 136b.
 Antelope, 137a.
 Antennae, 137b.
 Anther, 1354a.
 Anthology, 137b.
 Anthony, Saint, 2382b.
 Anthony, Susan Brownell, 138a, 3905b.
 Anthracite, 862b.
 Anthrax, 138a.
 Anthropology, 138b.
 Antichrist, 138b.
 Anti-Cigarette League, 138b.
 Anticosti Island, 139a, 2983a.
 Anticyclone, 1013a.
 Antidote, 139a.
 Antietam, Battle of, 140a.
 Anti-Federalist Party, 140a, 3052a, 3707b.
 Antigone, 140b.
 Antilles, 140b, 3850a.
 Antilles, Among the Lesser, 3619b.
 Anti-Masonic Party, 2890a.
 Antimony, 140b.
 Antimony Glance, 3424a.
 Antioch, Syria, 140b.
 Antiochus of Syria, 1890a.
 Antipodes, 141a.
 Antipope, 141a.
 Antipyrene, 141a.
 Anti-Saloon League, 141a.
 Antiseptic, 141a.
 Antitoxin, 141b.
 Anti-Trust Laws, 141b.
 Ant-lion, 141b.
 Antofagasta, Chile, 142a.
 Antoinette, Marie, 1659b.
 Antony, Mark, 142a, 285a, 848b, 3102b.
 Antwerp, Belgium, 142b.
 Anubis, 143a.
 Anvil, 143a.
 Aorta, 5b, 143a.
 Apache, 143a.
 Ape, 143b.
 Apelles, 144a.
 Apennines, The, 144a.
 Aphasia, 144a.
 Aphemia, 144a.
 Aphides, 144b.
 Aphrodite, 144b, 3753a.
 Aphrodite at the Bath, 2930a.
 Apia, Samoa, 144b.
 Apiary, 144b.
 Apis, 144b.
 Apocalypse, 145a, 3053b.
 Apocrypha, 145a, 403b.
 Apollo, 145a, 2452b, 2463a.
 Apollo Belvedere, 145a, 3232a.
 Apollonius of Perga, 83a.
 Apoplexy, 145a.
 Apostles, 145b.
 Apostles' Creed, 984b.
 Apostolic Succession, 145b.
 Apothecaries' Weight, 146a, 2927b.
 Apothecary, 146a.
 Apotheosis, 146a.
 Appalachian Mountains, 146a.
 Appalachicola River, 146b.
 Appeal, 146b.
 Appendicitis, 146b.
 Apperception, 147a.
 Appian Way, 147b, 3096b.
 Apple, 148a.
 Apple of Discord, 150b.
 Apple of Sodom, 3338a.
 Appleton, Wis., 150b.
 Apple-Tree Borer, 379a.
 Appomattox Court House, 150b.
 Apricot, 150b.
 April, 151a.
 Apse, 151b.
 Apsides, 151b.
 Apteryx, 152a.
 Aqua Fortis, 152a, 2576a.
 Aquamarine, 152a, 461a.
 Aquarium, 152a.
 Aquarius, 152b.
 Aquatic Plants, 152b.
 Aqueduct, 152b.
 Aqueous Ammonia, 113b.
 Aqueous Humor, 1287b.
 Aquilo, 31a.
 Aquinas, Saint Thomas, 153b.
 Arabat-el-Madfun, 9a.
 Arabia, 153b.
 Arabian Nights' Entertainment, The, 154b, 341b, 1638b, 3085b.
 Arabian Sea, 155a.
 Arabi Pasha, 155a.
 Arabs, 155a.
 Arachne, 155b.
 Arachne, The Story of, 2451b.
 Arachnida, 155b.
 Arachnoid Membrane, 542a.
 Arafat, 155b.
 Aragon, 156a, 3373b.
 Aragon and Castile, 3373b.
 Araguay, 156a.
 Aral, 156a.
 Aramaic, 156a.
 Arango, Doroteo, 3772a.
 Arapaho Indians, 156a.
 Ararat, Mount, 156a, 2577a.
 Araucanian, 156b, 793b.
 Araucaria, 156b.
 Arbela, Turkey, 156b, 1319b.
 Arbitration, 156b.
 Arbor Day, 157a, 2419b.
 Arbor Vitae, 157a.
 Arbutus, 157b.
 Arcade, 157b.
 Arcadia, 157b.
 Arch, 157b.
 Archaeological Ages, 44a.
 Archaeology, 158b.
 Archaeopteryx, 158b.
 Archangel, Russia, 158b.
 Archbishop, 159a.
 Archean System, 159a.
 Archer-fish, 159b.
 Archery, 159b.
 Archibald, Adams George, 160a.
 Archibald, Robert W., 1775b.
 Archimedean Screw, 160a.
 Archimedes, 160b.
 Archipelago, 1847b.
 Architecture, 160b.
 Architecture, Three Orders of, 895b.
 Architrave, 895b, 1238a.
 Arch of Trajan, 3607b.
 Arch of Triumph, 166b.
 Archon, 167a, 271b.
 Arc Light, 1203a.
 Arctic Circle, 167a.
 Arctic Ocean and Lands, 167a.
 Arcturus, 167b.
 Arden, Mary, 3267b.
 Ardmore, Okla., 167b.
 Areas, Study in, 1463b.
 Areas of Continents, Comparative, 34a.
 Areca, 167b.
 Arecibo, P. R., 168a.
 Areopagus, 168a.
 Argenta, Ark., 168a.
 Argentina, 168a.
 Argol, 3517b.
 Argon, 171a.
 Argonauts, 171a.
 Argus, 171b.
 Argyll, George John Douglas Campbell, 171b.
 Argyll, John Douglas Sutherland Campbell, 171b.
 Ariadne, 171b, 3565a.
 Arid Region, 172a.
 Ariel, 1456b.
 Aries, 172a.
 Arion, 172a.
 Ariosto, Ludovico, 172b.
 Ariovistus, 1497b.
 Arista, Mariano, 172b.
 Aristides, 172b.

Aristocles, 2871a.
 Aristocracy, 173a, 1542b.
 Aristophanes, 173a.
 Aristotle, 173a.
 Arithmetic, 174a, 2280a.
 Arizona, 210a.
 Arizona, University of, 213b.
 Ark, 214a.
 Arkansas, 214a.
 Arkansas, University of, 218b.
 Arkansas River, 218a.
 Arkwright, Richard, 218b.
 Arlington National Cemetery, 218b.
 Arm, 219a.
 Armada, 219a, 1319b.
 Armadillo, 219b.
 Armageddon, 219b.
 Armature, 219b, 1160a, 2219b.
 Armed Neutrality, 2518b.
 Armenia, 220a.
 Arminius, 221b, 1319b.
 Armistice, 221b, 3802b.
 Armor, 222b.
 Armored Tank, 3511a.
 Armour Family, 221b.
 Armour Institute of Technology, 222a.
 Arms, 222a.
 Armstrong, George B., 2920b.
 Armstrong, Samuel Chapman, 223b.
 Armstrong, William George, 224a.
 Armstrong Gun, 224a.
 Army, 224a.
 Army Worm, 230a.
 Arnica, 230a.
 Arnold, Benedict, 230b.
 Arnold, Edwin, 231a.
 Arnold, Matthew, 231a.
 Arnold, Thomas, 231b.
 Arnold Winkelried, The Story of, 3441b.
 Aromatic Plants, 231b.
 Around the World in Eighty Days, 3761a.
 Arrack, 871a, 3068b.
 Arras, France, 232a.
 Arrest, 232a.
 Arrondissement, 383a, 1061a, 2738b.
 Arrowrock Dam, 1759b, 1843a.
 Arrowroot, 232a.
 Arsenal, 232b.
 Arsenic, 139a, 232b.
 Arsenic Solution, 1806a.
 Arson, 233a.
 Art and the Arts, 233a.
 Artaxerxes, 233a.
 Artemis, 15a, 1070b.
 Arteries, 233b, 2842b, 3218b.
 Arteries, Hardening of the, 3218b.
 Arteries of the Face and Neck, 2509a.
 Artesian Well, 233b.
 Arthropoda, 234a.
 Arthur, Chester Alan, 234a.
 Arthur, Julia, 236b.
 Arthur, King, 236b, 1281b.
 Artichoke, 237a.
 Article (grammar), 237a.
 Articles, The Thirty-nine, 237a.
 Articles of Confederation, 3704b.
 Articulata, 234a.
 Articulation, 237a.
 Artificial Leather, 2073a.
 Artificial Limbs, 237b.
 Artificial Magnets, 2219a.
 Artificial Silk, 3306a.
 Artillery, 238a.
 Arts and Crafts, 239a.
 Arum, 239a.
 Aryan, 239a, 1780a, 2995a.
 Aryan Group of Languages, 2821b.
 Arytenoid Cartilage, 2061a.

Asafetida, 239b.
 Asbestos, 239b, 2983b.
 Asbjornsen, Peter Christen, 240a.
 Asbury, Francis, 240a.
 Asbury Park, N. J., 240a.
 Ascending Colon, 5b.
 Ascension, Right of, 240a.
 Ascension Day, 240b.
 Asceticism, 240b.
 Ascidians, 3242b.
 Asgard, 240b.
 Ash, 240b.
 Ashanti, 241a.
 Ashburton, Alexander Baring, 241a.
 Ashes, 240b.
 Asheville, N. C., 241a.
 Ashiwi Indians, 3988a.
 Ashland, Ky., 241b.
 Ashland, Wis., 241b.
 Ashlar Masonry, 2269a.
 Ashtabula, Ohio, 241b.
 Ash Wednesday, 242a.
 Asia, 242a.
 Asia Minor, 250b.
 Asiatic Cholera, 810b.
 Asp, 23a, 250b.
 Asparagus, 251a.
 Aspasia, 251a.
 Aspen, 251a, 2904a.
 Asphalt, 251a, 463a, 2759b.
 Asphalt Pavement, 2759b.
 Asphodel, 252a.
 Asphyxiation, 252a.
 Aspirates, 2683a.
 Aspirator, 252a.
 Asquith, Herbert Henry, 252b.
 Ass, 252b.
 Assam, 253a.
 Assassins, 253a.
 Assault and Battery, 253a.
 Assaying, 253b.
 Assembly, 254a.
 Assignment, 254a.
 Assimilation, 254a.
 Assiniboia, 254a.
 Assiniboin, 254a.
 Assiniboine River, 254a.
 Assistance, Writs of, 3950a.
 Assiut, 3315a.
 Associated Press, 254b.
 Associates (ethics), 1261a.
 Association Football, 254b, 1371b.
 Association of Ideas, 255b.
 Assuan, Egypt, 255b.
 Assuan Dam, 1845b.
 Assumpsit, 255b.
 Assumption, Feast of the, 255b.
 Assumption of the Virgin, 770a.
 Assurbanipal, 257a, 3196a.
 Assyria, 256a.
 Assyrian Sculpture, 3230b.
 Astarte, 2824a.
 Aster, 257a.
 Asteroids, 257a, 2865a.
 Asthma, 257b.
 Astigmatism, 258a.
 Astor (family), 258a.
 Astoria, Ore., 258b.
 Astragalus, 259a.
 Astrakhan (fur), 259a.
 Astrakhan, Russia, 259a.
 Astringent, 259a.
 Astrology, 259a.
 Astronomy, 259b.
 Astro-Photography, 269a.
 Asuncion, Paraguay, 269b.
 Atahualpa, 269b, 1776b.
 Atalanta, 269b.
 Atalanta, The Story of, 2456a.
 Atchafalaya, 269b.
 Atchison, Kan., 269b.
 Athabaska, 270a.
 Athabaska Lake, 270a.
 Athabaska River, 270a.
 Athapaskan Indians, 270a.
 Atheism, 270a, 1527b.

Athelstan, 270b.
 Athenaeum, 270b.
 Athene Nike, Temple of, 2573b.
 Athens, Ga., 272b.
 Athens, Greece, 270b.
 Atherton, Gertrude Franklin, 272b.
 Athletics, 273a.
 Athos, Mount, 275a.
 Atkinson, Edward, 275b.
 Atlanta, Ga., 275b.
 Atlantic Cables, 626b.
 Atlantic City, N. J., 276a.
 Atlantic Ocean, 276b.
 Atlantis, 277a.
 Atlas, 277a.
 Atlas Mountains, 277a.
 Atmosphere, 277b, 1466b, 3338b.
 Atoll, 278a.
 Atom, 278a, 766a.
 Atomic Theory, 278a.
 Atomic Weights, 278a.
 Atonement, 278b.
 Atrium, 279a.
 Atrophy, 279a.
 Atropos, 1302a.
 Attache, 1078a.
 Attachment, 279a.
 Attainder, 279b.
 Attainder, Bill of, 431b.
 Attar, 279b.
 Attention, 279b, 2767a, 2961b.
 Attica, 281a.
 Attila, 281a, 3104b.
 Attorney, Power of, 44a.
 Attribute Complement, 2048a.
 Auber, Daniel Francois Esprit, 281a.
 Auburn, Me., 281b.
 Auburn, N. Y., 281b.
 Aucite, 2975b.
 Auckland, New Zealand, 281b.
 Auction, 281b.
 Auction Bridge, 3863a.
 Audiphone, 282a.
 Audubon, John James, 282a.
 Audubon Society, The, 282a.
 Augean Stables, 282b.
 Augeas, 282b.
 Augite, 282b.
 Augsburg, Bavaria, 282b.
 Augsburg Confession, 283a.
 Augsburg, Peace of, 3566b.
 Augurs, 283a.
 August, 283a.
 Augusta, Ga., 284a.
 Augusta, Me., 284b.
 Augusta Bridge, 2484a.
 Augustan Age, 284b.
 Augustine, Aurelius Augustinus, Saint, 284b, 285a.
 Augustus, 285a.
 Augustus I, Frederick, 285b.
 Augustus II, Frederick, 285b.
 Auk, 285b.
 Auld Lang Syne, 286a.
 Aurelian, Lucius Domitius Aurelianus, 286b.
 Aurelius, Marcus, 286b.
 Aureola, 1617b.
 Auricle, 1656a.
 Aurora (mythology), 287a.
 Aurora, The, 2708b.
 Aurora, Ill., 287a.
 Aurora Borealis, 287a.
 Aurora Leigh, 573b.
 Ausgleich, 300a.
 Austen, Jane, 287b.
 Austerlitz, Battle of, 287b.
 Austin, Alfred, 287b.
 Austin, Stephen Fuller, 288a.
 Austin, Tex., 288a, 3552b.
 Australasia, 2632a.
 Australia, 288b.
 Australian Alps, 3769a.
 Australian Ballot, 294b.
 Australian Current, 2630b.
 Austria, 295a, 3763b.
 Austria-Hungary, 296a.
 Austrian Succession, War of the, 3459a.
 Authors, Hidden Names, 1242b.

Authors, Study of, 3015a.
 Autocrat of the Breakfast
 Table, 301b, 1708b.
 Autograph, 302a.
 Automatic Telephone, 3534a.
 Automobile, 302a, 3687a.
 Automobile Racing, 2994a.
 Autonomy, 305a.
 Autoplasty, 3319b.
 Autumn, 305b.
 Autumnal Equinox, 1035a,
 3242b.
 Autumn Fires, 2026a.
 Avahis, 2083a.
 Avalanche, 305b.
 Ave Maria, 305b.
 Avernus, 305b.
 Aviary, 306a.
 Avignon, France, 306a, 2901b.
 Avocado Pear, 98a.
 Avocet, 306a.
 Avogadro's Law, 306b.
 Avoirdupois Weight, 306b,
 2927a, 3843a.
 Avon, 306b.
 Ax, 306b.
 Axial Skeleton, 3317a.
 Axiom, 306b, 1481b.
 Axis, 306b.
 Axolotl, 307a.
 Aye-aye, 307a.
 Aymaras, 491a.
 Ayr, Scotland, 307a.
 Ayrshire Cattle, 729a.
 Azalea, 307b.
 Azerbaijan, 307b.
 Azincourt, 44b.
 Azoic Era, 307b.
 Azores, 307b.
 Azov, Sea of, 308a.
 Aztecs, 308b, 2321b.
 Azurite, 308b.

B

B, 309a.
 Baal, 309a, 2824a.
 Babbitt Metal, 309a.
 Babcock, O. E., 3862a.
 Babcock Test, 2339a.
 Babel, Tower of, 309a.
 Bab-el-Mandeb, Strait of, 309b.
 Babirusa, 309b.
 Baboon, 310a.
 Babylon, 310b.
 Babylonia, 310b.
 Bacchanalia, 311b.
 Bacchus, 311b.
 Bach, Johann Sebastian, 312a.
 Bacheller, Irving, 312a.
 Bachelor's Button, 312a, 962b.
 Bachelor's Degree, 312a.
 Bacillus, 312b, 314a.
 Backgammon, 312b.
 Bacon, 313a.
 Bacon, Francis, 313a.
 Bacon, Nathaniel, 313b.
 Bacon, Roger, 313b.
 Bacon's Rebellion, 313b.
 Bacteria and Bacteriology,
 314a.
 Baden, 315a.
 Baden, Austria, 315b.
 Baden-Powell, Robert Steven-
 son Smyth, 315b, 536b.
 Badger, 316a.
 Badger State, 3896b.
 Bad Lands, 316a, 3363a.
 Baeda, 372b.
 Baedeker Tourist Guides, 316b.
 Baffin, William, 316b.
 Baffin's Bay, 316b.
 Bagatelle, 316b.
 Bagdad, 316b.
 Bagpipe, 317a.
 Baguio, P. I., 3616b.
 Bahama Islands, 317b.
 Bahia, Brazil, 317b.
 Bahia Blanca, Argentina, 317b.
 Baikal, Lake, 318a.

Bail, 318a.
 Bailey, Liberty Hyde, 318a.
 Bailiff, 318a.
 Bainbridge, William, 318b.
 Baker, Ray Stannard, 318b.
 Bakersfield, Calif., 318b.
 Baking Powder, 318b.
 Baku, Russia, 319a.
 Balaam, 319a.
 Balaklava, Russia, 319a.
 Balance of Power, 319a.
 Balance of Trade, 319b.
 Balas, 3324a.
 Balboa, Vasco Nunez de, 320a.
 Bald Buzzard, 1334a.
 Bald Cypress, 1014a.
 Balder, 320a.
 Baldness, 320b.
 Bald Pate, 3869b.
 Baldwin, Robert, 320b.
 Baldwin of Flanders, 997b.
 Balearic Isles, 321a.
 Baleen, 3856a.
 Balfe, Michael William, 321a.
 Balfour, Arthur James, 321a.
 Baliol, John de, 321b, 3224a.
 Balkan Mountains, 321b.
 Balkan Wars, 322a, 596b.
 Balkash, Lake, 323a.
 Ballad, 323b.
 Ball and Socket Joint, 1906b.
 Ballarat, Australia, 324a.
 Ballet, 324a.
 Balloon, 324b.
 Ballot, 325b.
 Ball's Bluff, Battle of, 325b.
 Balm, 325b.
 Balm of Gilead, 325b, 2904a.
 Balsam, 325b.
 Balthasar, 2217b.
 Baltic Sea, 326a.
 Baltimore, George Calvert,
 326a, 2265a.
 Baltimore, Md., 326b.
 Baltimore Oriole, 328a.
 Baluchistan, 328a.
 Balzac, Honore de, 328b.
 Bamboo, 328b.
 Banana, 329a.
 Bancroft, George, 330a.
 Bancroft, Hubert Howe, 320b.
 Band, 320b.
 Bandage, 331b.
 Banderillero, 598b.
 Bandicoot, 331b.
 Banff, Alberta, 331b.
 Bangalore, India, 332a.
 Bangkok, Siam, 332a.
 Bangor, Me., 332a.
 Bangs, John Kendrick, 332b.
 Bangweolo, Congo District,
 332b.
 Banishment, 332b.
 Banjo, 332b.
 Bank Discount, 1079b.
 Bank Draft, 1111a.
 Bankers' Method, 205b.
 Bank Legals, 2386b.
 Bank of England, 335b.
 Bank of France, 335b.
 Bank of the United States,
 333a.
 Bankrupt, 333a.
 Banks and Banking, 333b.
 Bannockburn, 336b.
 Banns of Marriage, 336b.
 Banshees, 1294a.
 Banting, F. G., 337a.
 Bantu, 337a.
 Banyan, 337a.
 Baptism, 337a.
 Baptists, 337b.
 Baptist Y. P. Union, 337b.
 Baranof Island, 65a.
 Barbados Islands, 337b.
 Barbados Leg, 1211a.
 Barbara, Saint, 338a.
 Barbara Frietchie, 3869a.
 Barbarian, 338a.
 Barbary, 338a.
 Barbecue, 338b.

Barbel, 338b.
 Barber, 338b.
 Barberry, 339a.
 Barber's Itch, 339a.
 Barbizon Painters, 339b.
 Barcelona, Spain, 339b.
 Bard, 340a.
 Barebones Parliament, 340a,
 992a.
 Barefoot Boy, The, 3869a.
 Bareilly, India, 340a.
 Barge Canal, New York State,
 2561b.
 Bar Harbor, Me., 340a.
 Bari, Italy, 340b.
 Barium, 340b.
 Bark, 340b, 3626b.
 Bark Louse, 3208b.
 Barker's Mill, 341a.
 Barley, 341a.
 Barmecide's Feast, 341b.
 Barmen, Germany, 341b.
 Barnabas, 342a.
 Barnacle, 342a.
 Barnacle Goose, 342b.
 Barnard, Frederick Augustus
 Porter, 343a.
 Barnard, George Grey, 342b.
 Barnard, Henry, 343a.
 Barnard College, 343a.
 Barnburners, 343a, 2887b.
 Barnum, Phineas Taylor, 343b.
 Baroda, British India, 344a.
 Barometer, 344a.
 Baron, 345b.
 Barr, Amelia Edith Huddles-
 ton 345b.
 Barr, Robert, 345b.
 Barracks Emperors, 3263a,
 3732b.
 Barranquilla, Colombia, 346a.
 Barras, Paul Francois Jean
 Nicholas, 346a.
 Barre, Vt., 346a.
 Barrel, 346a.
 Barrett, John, 2725a.
 Barrett, Lawrence, 346b.
 Barrie, James Matthew, 346b.
 Barrie, Ont., 347a.
 Barrier Reef, 347a.
 Barrister, 347a.
 Barrow Point, 64a.
 Barry (family), 347b.
 Barry, Madame du, 2172a.
 Barrymore (family), 347b.
 Barter and Sale, 348a.
 Bartholdi, Frederic Auguste,
 348a.
 Bartholomew, 348a.
 Bartholomew's Day, Saint,
 348a.
 Bartlett, Paul Wayland, 348b.
 Bartolommeo, Fra, 348b.
 Barton, Clara, 349a.
 Baryta, 349a.
 Basal, 349b.
 Bascom, John, 349b.
 Bascule Bridge, 349b.
 Base, 349b.
 Baseball, 350a.
 Basel, Council of, 353a.
 Basel, Switzerland, 353a.
 Basilar Membrane, 1163b.
 Basilica, 353b.
 Basilisk, 353b.
 Basil the Great, 353b.
 Basin, 354a.
 Basin of Minas, 2344a, 2525a.
 Basket and Basketry, 354a.
 Basket Ball, 356a.
 Basket Ball (theme), 3559b.
 Basque, 358a.
 Bass (fish), 358a.
 Bass (music), 3311b.
 Basse-Terre, B. W. I., 358b,
 3621a.
 Bassoon, 359a.
 Bas-relief, 358a, 1219b.
 Bass Strait, 359a.
 Bass Viol, 359a.
 Basswood, 359a.

Bastien-Lepage, Jules, 359b.
 Bastille, 359b.
 Basutoland, 359b.
 Bat, 360a.
 Batangas, P. I., 360a.
 Batavia, D. E. I., 360b.
 Batavia, N. Y., 360b.
 Bath, 360b.
 Bath, Eng., 361b.
 Bath, Me., 362a.
 Bathing, 275a.
 Baths of Caracalla, 699a.
 Baton Rouge, La., 362a.
 Batrachians, 362a.
 Battalion, 226b, 362a.
 Battenberg, House of, 362b.
 Battering-ram, 362b.
 Battery, 362b.
 Battery, How to make a, 1196b.
 Battle, Trial by, 363a.
 Battle above the Clouds, 759b, 1716a.
 Battle Creek, Mich., 363a.
 Battlefields National Park, 2743a.
 Battleford, Sask., 363a.
 Battle Hymn of the Republic, 363b, 1728a.
 Battle of Chickamauga, 781a.
 Battle of the Marne, 2256a.
 Battle of the Nations, 2472b.
 Battle of Verdun, 3755b.
 Battles, Edward, 1319a.
 Battleship, 2497a.
 Batum, Russia, 363b.
 Baucis and Philemon, 364a.
 Bauxite, 364a.
 Bavaria, 364a.
 Bavarian Succession, War of the, 3460a.
 Baxter, Richard, 365a.
 Bay, 365a.
 Baya, 365a, 3838b.
 Bayard, Pierre du Terrail, 365b.
 Bayard, Thomas Francis, 365b.
 Bay City, Mich., 365b.
 Bayeux Tapestry, 366a, 1219b, 3513a.
 Bayonet, 366a.
 Bayonne, N. J., 366a.
 Bayreuth, Bavaria, 366a.
 Bay Rum, 366b.
 Bay Window, 366b.
 Bazaine, Francois Achille, 366b.
 Bazar, 366b.
 Beach, Rex, 367a.
 Beagle, 367a.
 Beam, 367a.
 Bean, 367a.
 Beanbag Game, 182a, 1439b.
 Bean Bag Race, 1440b.
 Bear, 367b.
 Bear, Great, 368b.
 Bear and Bull, 369a.
 Bearberry, 369a.
 Beard, 369a.
 Beard, Daniel Carter, 369b, 536b, 3261a.
 Bearded Vulture, 2009b.
 Bear State, The, 214a.
 Beast, Bird or Fish (game), 1441b.
 Beatrice, Neb., 369b.
 Beatrice Portinari, 370a.
 Beatty, David, 370a, 3924a.
 Beaumarchais, Pierre Augustin Caron de, 370a.
 Beaumont, Francis, 370b.
 Beaumont, Tex., 370b.
 Beauregard, Pierre Gustave Toutant, 370b.
 Beaver, 371a.
 Beaver State, 2672b.
 Bebel, Ferdinand August, 371b.
 Bechuana, 371b.
 Becket, Thomas á, 371b.
 Becky Sharp, 372a.
 Bed, 372a.

Bed (geology), 372b.
 Bedbug, 372b.
 Bedbug Poison, 139a.
 Bede, The Venerable, 372b.
 Bedford, Ind., 372b.
 Bedlam, 373a.
 Bedloe's Island, 373a.
 Bedouins, 373a.
 Bee, 373b.
 Beech, 376a.
 Beecher, Henry Ward, 376a.
 Beecher, Lyman, 376b.
 Beef, 377a, 1099b.
 Beef, Extract of, 377a.
 Beef Cattle, 728b.
 Beelzebub, 377b.
 Beer, 377b.
 Beersheba, 377b.
 Beeswax, 378a, 3834b.
 Beet, 378a.
 Beethoven, Ludwig von, 378b.
 Beetle, 378b.
 Beet Sugar, 3463a.
 Begin, Louis Nazaire, 379b.
 Begonia, 379b.
 Behring, Emil Adolf, 380a.
 Beirut, Asiatic Turkey, 380a.
 Bel, 309a.
 Belasco, David, 380a.
 Belem, Brazil, 2730a.
 Belfast, Ireland, 380b.
 Belgian Congo, 912a.
 Belgian Hare, 2992b.
 Belgium, 380b, 3917a.
 Belgrade, Serbia, 384a.
 Belial, 384a.
 Belisarius, 384a.
 Belize, British Honduras, 384b, 566b.
 Belknap, William W., 1775b.
 Bell, 384b.
 Bell, Alexander Graham, 385a, 1823a.
 Bell, John, 385b.
 Bell, Robert, 385b.
 Belladonna, 385b.
 Belladonna Lily, 386a.
 Bellaire, O., 386a.
 Bellamy, Edward, 386a.
 Bellbird, 386a.
 Bell-crank, 386b.
 Belleau Wood, 2253a.
 Belles-Lettres, 386b.
 Belle Isle, Strait of, 386b.
 Bellerophon, 386b.
 Belleville, Ill., 387a.
 Belleville, Ont., 387a.
 Belligerent, 387a.
 Bellingham, Wash., 387a.
 Bellini, Giovanni, 387b.
 Bellini, Vincenzo, 387b.
 Bellona, 387b.
 Bellows, 387b.
 Bell Metal, 570a.
 Bellows Fish, 388a.
 Bell-Smith, Frederick Marlett, 388a.
 Belmont (family), 388a.
 Beloit, Wis., 388b.
 Belshazzar, 388b, 422a.
 Belt, 388b.
 Belt, The Great, 389a.
 Beluga, 389a, 3453a.
 Benares, India, 389a.
 Benedict, Saint, 2382b.
 Benedict XV, 389b.
 Benedictine, 390a.
 Benedictines, 390a.
 Benefit of Clergy, 390a.
 Bengal, 390a.
 Bengal, Bay of, 391a.
 Bengali, 391a.
 Bengough, John Wilson, 391a.
 Benguela, Portuguese West Africa, 391a.
 Benguela Current, 2630a.
 Ben-Hur, 391b, 3789a.
 Benjamin, 391b.
 Benjamin, Judah Philip, 391b.
 Ben Lomond, 391b.

Bennett, [Enoch] Arnold, 392b.
 Bennett, James Gordon, 392a.
 Ben Nevis, 392b.
 Bennington, Vt., 392b.
 Bennington, Battle of, 393a.
 Bennington Battle Monument, 3759a.
 Bentinck, Count Goddard, 3878a.
 Benton, Thomas Hart, 393a, 2366a.
 Benton Harbor, Mich., 393b.
 Benzene, 393b.
 Benzine, 393b.
 Benzoate of Soda, 28b, 393b.
 Benzol, 393b.
 Beowulf, 394a, 2120b.
 Berber, 394a.
 Beresford, Lord Charles, 394a.
 Bergamot, 394a.
 Bergen, Norway, 394b.
 Bergh, Henry, 996b.
 Bergson, Henri Louis, 394b.
 Bering, Vitus, 395a.
 Bering Island, 395a.
 Bering Sea, 395a.
 Bering Sea Controversy, 395a.
 Bering Strait, 395b.
 Berkeley, Calif., 395b.
 Berkeley, William, 395b, 3799b.
 Berkshire Hills, 396a.
 Berlin, Congress of, 396a.
 Berlin, Germany, 396b.
 Berlin, N. H., 398a.
 Berlin, Treaty of 3652b.
 Berlin, University of, 398a.
 Berliner, Emile, 3506a.
 Berlioz, Hector, 398a.
 Bermuda Cedar, 733a.
 Bermuda Grass, 398b.
 Bermuda Islands, 398a.
 Bern, Switzerland, 398b.
 Bernard, Saint, 399a.
 Bernhardt, Rosine, 399a.
 Bernini, Giovanni Lorenzo, 399b, 3234a.
 Bernstorff, Count Johann Heinrich von, 399b, 3927a.
 Bersaglieri, 400a.
 Bertillon System, 400a.
 Bertrand, Count, 706b.
 Beryl, 400b.
 Besant, Annie, 3562a.
 Besant, Walter, 400b.
 Bessarabia, 400b.
 Bessemer, Ala., 401a.
 Bessemer, Henry, 401a.
 Bessemer Converter, 3418a.
 Bessemer Steel, 3418a.
 Bet, 3793b.
 Betel, 401a.
 Bethany, 402a.
 Bethel, 402a.
 Bethesda, 402a.
 Bethlehem, 402a.
 Bethlehem, Pa., 402a.
 Bethmann-Holweg, Theobald Theodore von, 402b.
 Beveridge, Albert Jeremiah, 402b.
 Beyrout, Asiatic Turkey, 380a.
 Bhutan, India, 402b.
 Bible, 403a.
 Bible Schools, 3472a.
 Bible Stories, 405b.
 Bibliography, 427a.
 Bibliomania, 427a.
 Bibliotheque Nationale, 427a, 2738a.
 Biceps, 427a.
 Bichloride of Mercury, 965b.
 Bicolors, 2818a.
 Bicycle, 427b.
 Biddeford, Me., 428a.
 Biela's Comet, 898a.
 Biennials, 428a, 522a, 2788a.
 Bienville, Jean Baptiste le Moyne, 428b.
 Bierstadt, Albert, 428b.
 Bigamy, 428b.
 Big Bend State, 3538b.

Big Dipper, 368b.
 Bigelow, Poultney, 429a.
 Bighorn, 429a, 3274b.
 Bighorn River, 429b.
 Biglow Papers, 429b.
 Bignonia, 429b.
 Big Sandy River, 429b.
 Big Trees, 3256a.
 Bilbao, Spain, 430a.
 Bile, 430a.
 Bile Duct, 1433b.
 Bill, 430a.
 Bill (legislative), 915b.
 Billiard Balls, 431a.
 Billiards, 430b.
 Billings, Mont., 431b.
 Billingsgate, 431b.
 Bill of Attainder, 431b.
 Bill of Costs, 432a.
 Bill of Exchange, 432a.
 Bill of Health, 432a.
 Bill of Lading, 432a.
 Bill of Rights, 432b.
 Bill of Sale, 432b.
 Biloxi, Miss., 432b.
 Bimetallism, 433a.
 Binder Twine, 433a.
 Bindweed, 433a.
 Bingen, Germany, 433b.
 Bingen on the Rhine, 434a.
 Binghamton, N. Y., 434a.
 Binocular, 434a.
 Binomial, 434a.
 Binomial Theorem, 434a.
 Biogenesis, 434a.
 Biography, 434b.
 Biological Survey, Bureau of, 51a.
 Biology, 449a, 3980a.
 Biplane, The, 1362b.
 Birch, 449a.
 Bird, 449b, 2487a.
 Bird Books, 458a.
 Bird Day, 455b.
 Bird Laws, 455b.
 Bird Migration, 2334a.
 Bird Reservations, 455a.
 Birds' Christmas Carol, The, 2138a.
 Bird's-eye Maple, 2489a.
 Birds of Paradise, 458b.
 Birds of Prey, 459a.
 Birkenhead, Eng., 459a.
 Birmingham, Ala., 459a.
 Birmingham, Eng., 460a.
 Birnam Wood, 460a.
 Birney, James Gillespie, 460b, 2894a.
 Births, Deaths, and Marriages, Registration of, 460b, 3043b.
 Birthstones, 461a.
 Bisbee, Arizona, 461a.
 Biscay, Bay of, 461a.
 Bishop, 461a.
 Bismarck, N. D., 461b.
 Bismarck Archipelago, 461b.
 Bismarck-Schonhausen, Karl Otto Eduard Leopold, 462a.
 Bismuth, 462b.
 Bison, 590b.
 Bithynia, Asia Minor, 462b.
 Bitter Ash, 2980a.
 Bittern, 463a.
 Bitternut, 463a.
 Bitterroot, 463a.
 Bitter Spar, 1092b.
 Bitterweed, 2998a.
 Bitumen, 463a.
 Bituminous Coal, 863a.
 Bituminous Shale, 463b.
 Bivalves, 2380b.
 Bizet, Alexandre Cesar Leopold, 463b.
 Bjornson, Bjornstjerne, 463b.
 Black, 464a.
 Black, William, 464a.
 Black Art, 2502b.
 Black Beetle, 3826a.
 Blackberry, 464a.
 Blackbird, 464b.
 Blackburn, Eng., 464b.

Black-Capped Chickadee, 3586b.
 Black Crabs, 2011b.
 Black Death, 464b, 2864a.
 Black-eyed Susan, 464b.
 Blackfish, 465a.
 Blackfoot Indians, 465a.
 Black Forest, 465a.
 Black Friars, 1105a.
 Black Friday, 1541a.
 Black Grouper, 1894a.
 Black Gum, 465a.
 Black Hawk, 465a.
 Black Hills, 465b, 3365a.
 Black Hole of Calcutta, 465b.
 Blacking, 466a.
 Black Lead, 2771b.
 Blacklist, 466a.
 Black Locust, 1714a.
 Blackmail, 466a.
 Black Man (game), 1440a.
 Black Monday, 2383b.
 Blackmore, Richard Doddridge, 466a.
 Black Mountains, 466b.
 Black Sea, 466b.
 Blacksnake, 466b.
 Blackstone, William, 467a.
 Blackwell, Elizabeth, 467a.
 Blackwell's Island, 467a.
 Bladderwort, 467b.
 Blaine, James Gillespie, 467b.
 Blair (family), 468a.
 Blake, Edward, 468b.
 Blake, Robert, 468b.
 Blanc-mange, 468b.
 Blancos, 3723b.
 Bland, Richard Parks, 469a.
 Bland-Allison Bill, 3712b.
 Blank Verse, 469a.
 Blarney Stone, 469a.
 Blashfield, Edwin Howland, 469b.
 Blast-furnace, 469b, 3416b.
 Blasting, 469b.
 Blavatsky, Helena Petrovna, 470a, 3562a.
 Bleaching, 470a.
 Bleak House, 1072b.
 Bleeding Heart, 470b.
 Blende, 470b.
 Blenheim, 470b, 1319b.
 Blennerhassett, Harman, 471a.
 Blesbok, 471a.
 Blessed Damosel, The, 3120b.
 Blest Be the Tie That Binds, 1750b.
 Blight, 471a.
 Blindfish, 471a.
 Blindness, 471a.
 Blind Spot, 1287b.
 Blindworm, 472b.
 Bliss, Philip Paul, 472b.
 Bliss, Tasker Howard, 472b.
 Blister, 473a.
 Blister Pearls, 2765a.
 Blizzard, 473a.
 Blockade, 473a.
 Block and Tackle, 473b.
 Blockhouse, 474a.
 Bloemfontein, Orange Free State, 474a.
 Blondel, 474a.
 Blood, 474b, 2842b.
 Blood, Avenger of, 475a.
 Blood, Circulation of the, 2842a.
 Blood, Transfusion of, 3608a.
 Bloodhound, 475a.
 Blood-money, 475a.
 Bloodroot, 475a.
 Bloodstone, 461a, 1665a.
 Bloody Assizes, 475b.
 Bloomer Costume, 475b.
 Bloomfield-Zeisler, Fanny, 475b.
 Bloomington, Ill., 475b.
 Bloomington, Ind., 475b.
 Blossoms and Fruit, 3627b.
 Blount, William, 1775a.

Blowfly, 476a.
 Blowing Machine, 476a.
 Blowpipe, 476b.
 Blubber, 476b, 3240a.
 Blucher, Gebhard Leberecht von, 476b.
 Blue, 477a.
 Blue Beach, 1720a.
 Bluebeard, 477a.
 Bluebell, 654b, 477a.
 Bluebird, 477a.
 Blue Books, 477b.
 Bluebuck, 137a.
 Bluefield, W. Va., 477b.
 Bluefields, Nicaragua, 477b.
 Bluefish, 478a.
 Blue Grass, 478a.
 Blue Grass State, 1936b.
 Blue Gum, 1266b.
 Blue Hen State, 1050b.
 Blue Heron, 1679a.
 Blue Laws, 478a.
 Blue Mountains, 478b.
 Blue Monday, 2383b.
 Blue Print, 478b.
 Blue Racer, 466b.
 Blue Ridge, 478b.
 Blue Sky Laws, 479a.
 Blue Vitriol, 479a, 3467b.
 Blunderbuss, 479a.
 Blushing, 479b.
 Boa, 479b.
 Boabdil, 479b.
 Boar, 480a.
 Board of Aldermen, 77b, 829b.
 Board of Trade, 480a.
 Boat, 481b.
 Boatbill, 485a.
 Boatswain, 485a, 3637b.
 Bobolink, 485a.
 Bobwhite, 2978a.
 Boccaccio, Giovanni, 485b.
 Bochum, Germany, 486a.
 Bodleian Library, 486a.
 Boehmeria, 486b.
 Boeotia, 486b.
 Boers, 486b, 3349b, 3610a.
 Bog, 486b.
 Bog Asphodel, 252a.
 Bog Bean, 585a.
 Bog Oak, 486b.
 Bogota, Colombia, 487a.
 Bohemia, 487a.
 Bohemian Girl, The, 321a.
 Bohlen, Gustav von, 1996a.
 Boies, Horace, 487b.
 Boil, 488a.
 Boiler, 488a.
 Boiling (cooking), 1100a.
 Boiling Point, 488b, 2837a, 3563b.
 Bois de Boulogne, 489a.
 Boise, Ida., 489a.
 Bok, Edwin W., 489b.
 Bokhara, 489b.
 Bokhara Rugs, 3130a.
 Boleyn, Anne, 490a, 725b, 1671b.
 Bolingbroke, Henry Saint John, 490b.
 Bolivar, Simon, 490b, 492b, 3750b.
 Bolivia, 491a.
 Boll Weevil, 492b, 3842b.
 Bologna, Italy, 493a.
 Bolsheviks and Bolshevism, 493b, 1326a, 3137b, 3138b, 3145b, 3293a, 3377b, 3493a, 3638a, 3926a.
 Bolton, 494a.
 Bomb, 494a.
 Bombardier Beetle, 494b.
 Bombardment, 494b.
 Bombay (city), 495b.
 Bombay (Presidency), 494b.
 Bombazine, 496a.
 Bona Fide, 496a.
 Bonanza, 496a.
 Bonaparte (family), 496a.
 Bonaparte, Charles, 2470b.
 Bonaparte, Joseph, 2472a.

Bond, 497b.
 Bonded Warehouses, 1011b.
 Bone, 498b.
 Boneblack, 499a.
 Boneset, 499a.
 Bonheur, Marie Rosa, 499a.
 Bon Homme Richard, 499a, 3057a.
 Boniface (Popes), 499b.
 Boniface, Saint, 499b.
 Bonito, 499b.
 Bonn, Germany, 500a.
 Bonnet-rouge, 500a, 2095b.
 Bonspiel, 1009b.
 Bonus, 500a.
 Bony Fish, 2298a.
 Booby, 500a.
 Book, 500b.
 Bookbinding, 501b.
 Bookkeeping, 502b.
 Book of Mormon, 2413a.
 Bookplate, 503b.
 Books for Young People and Adults, 3012b.
 Bookworm, 504a.
 Boomerang, 504a.
 Boomer State, 2646a.
 Boone, Daniel, 504a, 1941a.
 Boone, Iowa, 504b.
 Booth (family), 504a, 3179b.
 Booth, John Wilkes, 2113b.
 Booth-Tucker, Frederick, 505b.
 Boots and Shoes, 506a.
 Borage, 507a.
 Borax, 507a.
 Bordeaux, France, 507b.
 Bordeaux Mixture, 1806b.
 Borden, Robert Laird, 507b.
 Bore, 508a.
 Boreas, 508a.
 Borghese (family), 508a.
 Borghese Palace, 508a.
 Borgia (family), 508b.
 Borglum, Gutzon, 508b, 3428a.
 Boric Acid, 509a.
 Boring Machines, 509a.
 Borneo, 509b.
 Boron, 510a.
 Bosnia, 510a.
 Bosphorus, 510b.
 Boston, Mass., 510b.
 Boston Massacre, 515a.
 Boston Tea Party, 515a.
 Boston University, 515a.
 Boswell, James, 515a.
 Bosworth Field, Battle of, 515b.
 Botanic Garden, 515b.
 Botany, 516a.
 Botany Bay, 529a.
 Botfly, 529a.
 Bothnia, Gulf of, 529a.
 Bothwell, James Hepburn, Earl of, 529a.
 Botticelli, Sandro, 529b, 2704a.
 Bottle, 529b.
 Bottle-tree, 530a.
 Boucicault, Dion, 530a.
 Boughton, George Henry, 530a.
 Boulanger, Georges Ernest Jean Marie 530a.
 Boulder, 530b.
 Boulder, Col., 530b.
 Boulogne, France, 530b.
 Bounty, 531a.
 Bouquetin, 1753b.
 Bourbon, 531a.
 Bourbon, Ile de, 3053b.
 Bourgeoisie, 532a.
 Bourget, Paul, 532a.
 Bourinot, John George, 532a.
 Bow, 532b.
 Bowdoin, James, 532b.
 Bowdoin College, 532b.
 Bowell, Mackenzie, 533a.
 Bower-bird, 533a.
 Bowery, The, 533b.
 Bowie, James, 63a.
 Bowling, 533b.
 Bowling Green, Ky., 534a.
 Box-elder, 534b.

Boxer Rebellion, 534b.
 Boxing, 534b.
 Boxing the Compass, 535a.
 Box Kite, 1987a.
 Box Tortoise, 535a.
 Box Tree, 535b.
 Boycotting, 535b.
 Boy Kite, 1987b.
 Boyle's Law, 535b.
 Boyne, Battle of the, 535b.
 Boys and Girls Clubs, 536a.
 Boy Scouts, 536b, 3261a.
 Boy Scouts' Signal Code, 3301a.
 Boy's Song, A, 2034b.
 Bozeman, Mont., 537a.
 Bozzaris, Marco, 537a.
 Brabant, 537b.
 Braddock, Edward, 537b.
 Braddock, Pa., 538a.
 Bradford, Eng., 538a.
 Bradford, Pa., 538a.
 Bradford, William, 538b.
 Bradley, Joseph Philo, 538b.
 Bradstreet, Anne, 538b.
 Brady, Cyrus Townsend, 539a.
 Bragg, Braxton, 539a.
 Brahe, Tycho, 539b.
 Brahma, 539b.
 Brahmanism, 539b.
 Brahmaputra, 540b.
 Brahms, Johannes, 541a.
 Braille System, 472a.
 Brain, 541a.
 Brain, Development of the, 2963a.
 Brake, (mechanics), 542a.
 Brake, (plant), 542b.
 Bramante, Donato, 542b.
 Bramble, 542b.
 Bran, 542b, 1353b.
 Brandeis, Lewis Demblitz, 542b.
 Brandenburg, Prussia, 543a.
 Brandes, Georg Morris Cohen, 543a.
 Brandon, Man., 543b.
 Brandy, 543b.
 Brandywine, Battle of the, 543b.
 Brangwyn, Frank, 543b.
 Brant, Joseph, 544a, 2657b.
 Brant Goose, 551a.
 Brantford, Ont., 544a.
 Brass, 544a.
 Brazen Serpent, 544b.
 Brazil, Ind., 544b.
 Brazil, The United States of, 545a.
 Brazilian Current, 2630a.
 Brazil Nut, 547b.
 Brazilwood, 547b.
 Brazos River, 547b.
 Breach of Promise, 548a.
 Breach of the Peace, 2761a.
 Bread, 548a, 2491b.
 Breadfruit, 548b.
 Breakspear, Nicholas, 28a.
 Breakwater, 549a.
 Breathing, 549b.
 Breathing Exercises, 2835a.
 Breckenridge, John Cabell, 550a.
 Breeches Bible, 404b.
 Breeding, 550a.
 Bremen, Germany, 550b.
 Bremerhaven, Germany, 551a.
 Brent Goose, 551a.
 Brescia, Italy, 551a.
 Breslau, Germany, 551a.
 Brest-Litovsk, Russia, 551b.
 Brest, France, 551b.
 Bretagne, or Brittany, 568a.
 Brevet, Jules Adolph, 552a.
 Brevet, 552a.
 Breviary, 552a.
 Brewer, David Josiah, 552a.
 Brewing, 552b.
 Brewster, David, 553a, 1359a.
 Brewster, William, 553a.
 Briand, Aristide, 553a.

Bribery, 553b.
 Brick and Bricklaying, 553b.
 Brick Pavement, 2759b.
 Bridge, 555a.
 Bridge (game), 3862b.
 Bridge of Sighs, 557b, 3751b.
 Bridgeport, Conn., 557b.
 Bridges, Robert, 558a.
 Bridge Whist, 3862b.
 Bridgman, Laura Dewey, 558a.
 Brigade, 227a, 558b.
 Brigandage, 558b.
 Bright, John, 558b.
 Brighton, Eng., 559a.
 Bright's Disease, 559a.
 Brimstone, 559a, 3467a.
 Briquettes, 1422a.
 Brisbane, Arthur, 559b.
 Brisbane, Australia, 559b.
 Bristles, 559b.
 Bristol, Conn., 559b.
 Bristol, Eng., 560a.
 Bristol, R. I., 560a.
 Bristol, Tenn, 560a.
 Bristol, Va., 560a.
 Bristol Board, 702b.
 Bristol Channel, 560b.
 Bristow, Benjamin H., 3862a.
 British Almanac, 100b.
 British America, 560b.
 British Association for the Advancement of Science, 560b.
 British Cabinet, 624a.
 British Colonies, 883b.
 British Columbia, 561a.
 British East Africa, 565a.
 British Empire, 565a.
 British Guiana, 566a.
 British Honduras, 566b.
 British Isles, 567a.
 British Museum, 567a.
 British North America Act, 567b, 2986b.
 British Somaliland, 3344b.
 British West Indies, 567b.
 Britannia Secunda, 3796a.
 Brittany, 568a.
 Broad Church, 1235b.
 Broadway, 2556a.
 Brocade, 568a.
 Brock, Isaac, 568b.
 Brockton, Mass., 568b.
 Brockville, Ont., 568b.
 Brodeur, Louis Philippe, 569a.
 Broiling (cooking), 1099b.
 Broken Wind, 1659b.
 Broker, 569a.
 Bromides, 569b.
 Bromine, 569b.
 Bronchial Tubes, 569b.
 Bronchitis, 569b.
 Bronte, Charlotte, 570a.
 Bronze, 570a.
 Bronze Age, 570b.
 Brook Farm, 570b.
 Brookline, Mass., 570b.
 Brooklyn, N. Y., 571a.
 Brooklyn Bridge, 557a, 3090b.
 Brooks, Phillips, 571a.
 Brooks, Preston Smith, 571b.
 Broom Corn, 571b.
 Broom Grass, 571b.
 Brother Jonathan, 571b, 3640a.
 Brough, Frances, 2255a.
 Broussa, 577b.
 Brown, 572a.
 Brown, Charles Brockden, 572a.
 Brown, Elmer Ellsworth, 572a.
 Brown, George, 572a.
 Brown, Jacob, 3805b.
 Brown, John (American), 572b.
 Brown, John (Scotchman), 572b.
 Brown, John George, 573a.
 Browne, Charles Farrar, 573a.
 Brownies, The, 573a, 979b.
 Browning, Elizabeth Barrett, 573b.

Browning, Robert, 574a.
 Browning Gun, 2203a, 3074a.
 Brownstone, 594b.
 Brownsville, Tex., 574b.
 Browntail Moth, 575a, 3656b.
 Brown Thrasher, 575a, 3576a.
 Brown Thrush, The, 2027a.
 Brown University, 575a.
 Bruce, Robert, 575b, 3224a.
 Bruges, Belgium, 575b.
 Brummell, George Bryan, 576a.
 Brunelleschi, Filippo, 576a.
 Brunhilde, 3302a.
 Brunn, Austria, 576a.
 Brunswick (family), 576b.
 Brunswick (former duchy), 576b.
 Brunswick, Ga., 577a.
 Brunswick, Germany, 577a.
 Brunswick Black, 577b.
 Brusa, 577b.
 Brush, 577b.
 Brush, Charles Francis, 577b.
 Brussels, Belgium, 578a.
 Brussels Rug, 3130b.
 Brussels Sprouts, 578b.
 Brutus, Decimus Junius, 578b.
 Brutus, Marcus Junius, 578b.
 Bryan, William Jennings, 579a, 3713a.
 Bryant, William Cullen, 580a, 3022a.
 Bryce, George, 580b.
 Bryce, James, 581a.
 Bryn Mawr College, 581a.
 Bryophytes, 516b, 518a, 581a, 2144a.
 Bubastis, 581b.
 Bubonic Plague, 2864a.
 Buccaneers, 581b, 2411b.
 Bucentaur, 581b.
 Bucephalus, 581b.
 Buchanan, James, 583a.
 Buchanan, Robert William, 583b.
 Bucharest, Peace of, 3652b.
 Bucharest, Rumania, 585a.
 Buck, Dudley, 585a.
 Buck Bean, 585a.
 Buckboard, 585b.
 Bucket Shop, 585b.
 Buckeye, 585b, 2637a.
 Buckingham, George Villiers, 585b.
 Buckle, Henry Thomas, 586a.
 Buckler, 3280a.
 Buckner, Simon Bolivar, 586a.
 Buckskin, 586a, 1048a.
 Buckthorn, 586b.
 Bucolics, 3756a.
 Buckwheat, 586b.
 Bud, 587a.
 Budapest, Hungary, 587a.
 Buddha, 588a.
 Buddhism, 588a.
 Budding, 1544a.
 Budget, 589a.
 Budget, The (Canada), 2747a.
 Buds and Branches, 3626a.
 Buell, Don Carlos, 589a.
 Buena Vista, Battle of, 589b.
 Buenos Aires, Argentina, 589b.
 Buffalo, 590a.
 Buffalo, N. Y., 591a.
 Buffalo Bill, 872b.
 Buffalo Grass, 592a.
 Buffalo Park, 2743a.
 Bug, 592a.
 Buggy, 592b.
 Bugle, 592b.
 Building, 593a.
 Building Laws, 594a.
 Building-stone, 594b, 3678b.
 Bukharest, Rumania, 585a.
 Bukowina, 594b.
 Bulb, 595a.
 Bulgaria, 595b, 3764a.
 Bull, 597b.
 Bull, Ole Bornemann, 597b.
 Bullard, Robert Lee, 597b.

Bulldog, 598a.
 Buller, Redvers, 3350a.
 Bullet, 598a.
 Bullfighting, 598a.
 Bullfinch, 598b.
 Bullfrog, 598b.
 Bullion, 599a.
 Bullion State, 2366a.
 Bullock, William, 2546b.
 Bull Run, Battles of, 599a.
 Bulls and Bears, 369a.
 Bull's-eye, 599b, 3515a.
 Bulow, Bernhard Heinrich, 599b.
 Bulow, Hans Guido von, 599b.
 Bulrush, 600a.
 Bulwer-Lytton, Edward George Earle, 600a.
 Bulyea, George Headley Vickers, 600a.
 Bumblebee, 600a.
 Bundesrat, 600b.
 Bundes-Versammlung, 3488a.
 Bungalow, 161a, 600b.
 Bunion, 601a.
 Bunker, 2298a.
 Bunker Hill, Battle of, 601a.
 Bunsen, Robert Wilhelm Eberhard, 601b.
 Bunsen's Battery, 601b.
 Bunsen's Burner, 601b.
 Bunt, 601b.
 Bunting, 601b.
 Bunyan, 602a.
 Buoy, 602a.
 Burbank, Luther, 464a, 602b.
 Burbank Potato, 2923b.
 Burbot, 604b.
 Burdette, Robert Jones, 604b.
 Burdock, 605a.
 Bureau, 605a.
 Bureau of American Ethnography, 1265a.
 Bureau of American Republics, 2725a.
 Bureau of Animal Industry, 3766a.
 Bureau of Corporations, 1305a.
 Burgesses, House of, 1871a.
 Burglary, 605a.
 Burgomaster, 605b.
 Burgoyne, John, 605b.
 Bur Grass, 3184a.
 Burgundy, 605b.
 Burgundy Wines, 605b.
 Burial, 605b.
 Burke, Edmund, 606a.
 Burlap, 606b.
 Burlesque, 606b, 1115a.
 Burlingame, Anson, 606b.
 Burlington, Ia., 607a.
 Burlington, N. J., 607a.
 Burlington, Vt., 607a.
 Burma, 607b.
 Burne-Jones, Edward, 608a.
 Burnett, Frances Eliza Hodgson, 608a.
 Burnham, Daniel Hudson, 608b.
 Burnham, Sherburne Wesley, 608b.
 Burning, 896b.
 Burning Glass, 609a, 2084b.
 Burnley, Eng., 609a.
 Burns, John, 609a.
 Burns, Robert, 609b.
 Burns and Scalds, 610b.
 Burnside, Ambrose Everett, 610b.
 Burnt Offering, 3153a.
 Burr, Aaron, 611a.
 Burroughs, John, 611b.
 Burying Beetle, 611b.
 Bury the Hatchet, 3592b.
 Bushbuck, 137a.
 Bushel, 612a.
 Bushmen, 612a.
 Bushnell, David, 1823a.
 Business College, 612a.
 Bust, 612b.
 Bustard, 612b.

Butcher Bird, 3290b.
 Butler, Benjamin F., 612b.
 Butler, Ellis Parker, 613a.
 Butler, Nicholas Murray, 613a.
 Butler, Pa., 613b.
 Butler, Pierce, 613a.
 Butler College, 613b.
 Butte, 613b.
 Butte, Mont., 613b.
 Butter, 614a.
 Buttercup, 614b.
 Buttercup Family, 524a.
 Butter Factory, 983a.
 Butterfly, 615a.
 Butterfly Kite, 1987b.
 Butterine, 2653b.
 Butternut, 618a.
 Butterweed, 1345b.
 Butterwort, 618a.
 Butterworth, Hezekiah, 618a.
 Buttons, 618b.
 Buzzard, 619a.
 Buzzard's Bay, 619a.
 By-law, 619a.
 Byng, Julian, Lord, 619a.
 Byrom, John, 3287b.
 Byron, George, (Lord) 619b.
 Byzantine Art, 620b.
 Byzantine Empire, 621a.
 Byzantine Architecture, 164b.
 Byzantium, 622b, 925b.

C

C, 623a.
 Caaba, 1922a.
 Cabal, 623a.
 Cabbage, 623a.
 Cabbage Palm, 623b.
 Cabbage Rose, 623b.
 Cabinet (British), 1560a.
 Cabinet, Coalition, 865b.
 Cabinet Making, 625b.
 Cabinet of the President, 624a.
 Cabin John Bridge, 158a.
 Cable, George Washington, 625b.
 Cable, Submarine, 626a.
 Cabot (family), 627b.
 Cabot, Sebastian, 3779b.
 Cabral, Pedro Alvarez, 628a.
 Cabul, Afghanistan, 1922a.
 Cadorna, General, 3922a.
 Caecum, 1822a.
 Cacao, 628a.
 Cactus, 628b.
 Caddice Fly, 629b.
 Caddoan Indians, 629b.
 Cadillac, Mich., 629b.
 Cadiz, Spain, 629b.
 Cadmium, 630a.
 Cadmus, 630a, 2450b.
 Caduceus, 630a.
 Caedmon, 630b.
 Caesar, 630b.
 Caesar, Caius Julius, 630b, 848b.
 Caesium, 632a.
 Caffeine, 632a, 873a.
 Caffetannic Acid, 3512a.
 Cagliari, 632b.
 Caiaphas, 632b.
 Cain, 632b.
 Caine, Thomas Henry Hall, 632b.
 Cairn, 633a.
 Cairo, Egypt, 633a.
 Cairo, Ill., 633b.
 Caisson (artillery), 634a.
 Caisson (engineering), 633b, 1088a.
 Calabar Bean, 634a.
 Calabash, 634b.
 Calais, France, 634b.
 Calamint, 634b.
 Calamus, 635a.
 Calceolaria, 635a.
 Calcimine, 635a.

Calcination, 635a.
 Calcite, 635b.
 Calcium, 635b.
 Calcium Carbide, 635b.
 Calculating Machines, 635b.
 Calculus (mathematics), 636a.
 Calculus (medicine), 636b.
 Calcutta, British India, 636b.
 Caledonia, 637a, 3219b.
 Caledonian Canal, 637a.
 Calendar, 637a.
 Calends, 1923b.
 Calgary, Alberta, 638a.
 Calhoun, John Caldwell, 638b.
 Calico, 639b.
 Calico Bush, 1923b.
 California, 640a.
 California, Gulf of, 645a.
 California, University of, 645a.
 California Current, 2630b.
 Caligula, Gaius Caesar Augustus Germanicus, 645b.
 Calipers, 645b.
 Caliph, 645b.
 Calipha, 2414b.
 Calisthenics, 646a.
 Calixtus (Popes), 646a.
 Calking, 646a.
 Calla, 646a.
 Callao, Peru, 646a.
 Calling Hare, 2852a.
 Calliope, 646b.
 Calliope (mythology), 2438b.
 Calms, Regions of, 646b.
 Calmucks, 1924a.
 Calomel, 646b.
 Calorie, 646b, 1367a, 3564a.
 Calorimeter, 647a.
 Calory, 646b.
 Calumet, 647a.
 Calumet and Hecla Mine, 2346b.
 Calvary, 647a.
 Calve, Emma, 647a.
 Calvin and Calvinism, 647a.
 Calycanthus, 648a.
 Calypso, 648a.
 Calyx, 519a, 648a, 1354a.
 Cam, 648a.
 Camaguey, Cuba, 648a.
 Cambodia, Indo-China, 648b.
 Cambodia River, 2293b.
 Cambon, Jules Martin, 648b.
 Cambrai, France, 648b.
 Cambrian Period, 649a.
 Cambrian System, 649a.
 Cambric, 649a.
 Cambridge, Mass., 649a.
 Cambridge, O., 649b.
 Cambridge, Univ. of, 649b.
 Cambyses, 649b, 1190b.
 Camden, Battles of, 650a.
 Camden, N. J., 650a.
 Camel, 650b.
 Camel Bird, 2688a.
 Camellia, 651a.
 Camelopard, 1513b.
 Cameo, 651a, 2931a.
 Camera, 651b.
 Camera Lucida, 652b.
 Camera Obscura, 652b.
 Cameron, Simon, 652b.
 Cameroon, 1924a.
 Camille, 653a, 1153a.
 Camoes, Luis de, 653a.
 Camomile, 748a.
 Camorra, 653a.
 Camouflage, 238a, 653b.
 Camp, Walter, 653b.
 Campagna di Roma, 654a.
 Campanile, 384b, 654a.
 Campanini, Cleofonte, 654a.
 Campanula, 654b.
 Campbell, Alexander, 654b.
 Campbell Alexander (Canadian), 654b.
 Campbell, Colin, 655a.
 Campbell, Thomas, 655a.
 Campbell-Bannerman, Henry, 655b.

Campeachy, 655b.
 Camp-Fire Girls, 655b.
 Camphor, 656b.
 Campo-Formio, Treaty of, 1853b.
 Campo Santo, 657a.
 Camps and Camping, 657a.
 Campus Martius, 660a.
 Canaan, 411a.
 Canaanites, 660a.
 Canada, Dominion of, 660b.
 Canada, Supreme Court of, 3475b.
 Canada and the World War, 665b.
 Canada Balsam, 676a.
 Canada East, 2984b.
 Canada Goose, 676a.
 Canada Thistle, 676b.
 Canada West, 2658a.
 Canadian Agricultural Colleges, 51b.
 Canadian Banks, 336b.
 Canadian Cabinet, 624b.
 Canadian Civil Service, 836b.
 Canadian Department of Agriculture, 51b.
 Canadian Experiment Farms and Stations, 52a.
 Canadian Hemp, 1091a.
 Canadian Northern Railway, 3002b.
 Canadian Northwest, 3134b.
 Canadian Pacific Railroad, 3002b.
 Canadian River, 676b.
 Canadian Rockies, 3088b, 3089a.
 Canadian Rugby, 1371a.
 Canadian Weather Bureau, 3838a.
 Canadian Universities, 3720b.
 Canal, 676b.
 Canals of Canada, 678a.
 Canal Zone, 2722b.
 Canary, 679b.
 Canary Current, 2630a.
 Canary Islands, 680a.
 Canary Seed, 680a.
 Cancellation, 680b.
 Cancer (astronomy), 681a, 3638a.
 Cancer (medical), 680b.
 Candahar, Afghanistan, 1924b.
 Candle, 681b.
 Candleberry, 681b.
 Candlefish, 681b.
 Candlemas, 681b, 3908a.
 Candy, 681b.
 Candytuft, 682b.
 Cane, 682b.
 Canella, 683a.
 Cane Sugar, 3462b.
 Canine Tooth, 3527a.
 Canis Major, 683a.
 Canker, 683a.
 Cankerworm, 683a.
 Cannae, Italy, 683a.
 Cannel Coal, 863a.
 Cannibal, 683b.
 Canning, 683b.
 Canning, George, 1562b.
 Canning Clubs, 685a.
 Cannon, 685b.
 Cannon, Joseph Gurney, 686b.
 Canoe, 687a.
 Canon Law, 687b.
 Canonization, 687b.
 Canova, Antonio, 687b, 3234b.
 Cantabrian Mountains, 688a.
 Cantaloupe, 2444a.
 Cantata, 688a.
 Canterbury, Eng., 688a.
 Canterbury Tales, 688b, 760b, 2121a.
 Canticles, 3343a.
 Cantilever Bridge, 556a.
 Canton (district), 1061a.
 Canton, China, 688b.
 Canton, Ill., 689a.

Canton, O., 689a.
 Cantonment, 689a.
 Canute, 689b.
 Canvas, 689b.
 Canvasback, 690a, 1150a.
 Canyon, 690a, 3079b.
 Canyons of the Yellowstone, 3963a.
 Caoutchouc, 3128a.
 Cap, 690a.
 Capacity, Measures of, 2300a.
 Cape Ann, 690a.
 Cape Barrow, 690a.
 Cape Blanco, 690a.
 Cape Breton, 690b.
 Cape Charles, 690b.
 Cape Clear, 690b.
 Cape Cod, 690b.
 Cape Cod Canal, 691a.
 Cape Comorin, 691a.
 Cape Fear, 691a.
 Cape Flattery, 691b.
 Cape Girardeau, Mo., 691b.
 Cape Hatteras, 691b.
 Cape Henlopen, 691b.
 Cape Henry, 691b.
 Cape Horn, 691b.
 Cape Jasmine, 1878b.
 Cape Lookout, 691b.
 Cape May, N. J., 692a.
 Cape of Good Hope, 692a.
 Cape of Good Hope, Province of the, 692a.
 Caper, 693a.
 Capercaillie, 693b.
 Capernaum, 693b.
 Cape Sable, 693b.
 Cape Saint Vincent, 693b.
 Capetian Dynasty, 693b.
 Cape-to-Cairo Railway, 693b.
 Cape Town, So. Africa, 694b.
 Cape Verde, 695a.
 Cape Verde Islands, 695a.
 Cape Wrath, 695a.
 Capias, 695a.
 Capillaries, 695b.
 Capillarity, 695b.
 Capital (architecture), 696b.
 Capital (economics), 696a.
 Capital Letters, 696b.
 Capital Punishment, 696b.
 Capital Punishment Should be Abolished (theme), 3560b.
 Capitals of the United States, 697a.
 Capital Stock, 3424b.
 Capitol, 697a.
 Cap of Liberty, 500a.
 Cappadocia, 697b.
 Capricorn, Tropic of, 3638a.
 Capricornus, 697b.
 Caprification, 1320b.
 Caprivi, George Leo, 697b.
 Capsicum, 697b.
 Capsule, 697b.
 Capua, Italy, 698a.
 Capuchins, 698a.
 Capybara, 698b.
 Carabao, 698b.
 Caracal, 698b.
 Caracalla, 698b.
 Caracalla, Baths of, 3096b.
 Caracas, 699a.
 Caramel, 699a.
 Carat, 699a.
 Caravaggio, Michelangelo Amerigi Merisi da, 699b.
 Caravan, 699b, 3156b.
 Caravel, 699b.
 Caraway, 700a.
 Carbohydrate, 700a, 1096b, 1367a.
 Carbolic Acid, 139a, 700a.
 Carbon, 700a.
 Carbonate Ore, 1837b.
 Carbonates, 700b.
 Carbondale, Pa., 700b.
 Carbon Dioxide, 701a.
 Carbon Disulphide, 700b, 3467b.
 Carbonic Acid, 767a.

- Carbonic Acid Gas, 139a, 701a.
 Carbonic Oxide, 139b, 701a.
 Carboniferous Period, 701b.
 Carboniferous System, 701b.
 Carbon Monoxide, 701a.
 Carborundum, 701b.
 Carbuncle, 100b, 702a.
 Carburetor, 702a.
 Cardemom, 702b.
 Cardboard, 702b.
 Cardenas, 703a.
 Cardiff, Wales, 703a.
 Cardinal, 703a.
 Cardinal Bird, 703a.
 Cardinal Flower, 703b.
 Cardinals, College of, 3152b.
 Cards, Playing, 703b.
 Caret, 1646b.
 Carey, Henry, 703b.
 Carey Act, 1842a.
 Caribbean Sea, 703b.
 Caribou, 704a.
 Caribs, 3621b.
 Caricature, 704a, 714b.
 Carleton, Guy, 704a.
 Carleton, Will, 704b.
 Carlisle, Pa., 704b.
 Carlos I, 704b.
 Carlsbad, Bohemia, 705a.
 Carlsruhe, Germany, 705a.
 Carlyle, Thomas, 705a.
 Carman, Albert, 706a.
 Carman, (William) Bliss, 706a.
 Carmel, 706b.
 Carmelites, 706b.
 Carmen, 463b, 558b, 706b, 2306b.
 Carmine, 706b.
 Carnation, 707a.
 Carnegie, Andrew, 707a.
 Carnegie Foundation for the
 Advancement of Teaching,
 707b.
 Carnegie Hero Fund, 707b.
 Carnegie Institution, 707b.
 Carnegie Libraries, 708a.
 Carnegie Peace Fund, 708a.
 Carnelian, 708a.
 Carnivorous Animals, 708b.
 Carnivorous Plants, 708b.
 Carnot, Marie Francois Sadi,
 708b.
 Carolina Jasmine, 1879a.
 Carolingians, 709a.
 Carotid Arteries, 709a.
 Carp, 709a.
 Carpathian Mountains, 709b.
 Carpenter, Frank George, 709b.
 Carpenter-bee, 709b.
 Carpet, 709b.
 Carpetbaggers, 710a, 3711b.
 Carpet Beetle, 710a.
 Carpet Sweeper, 710b.
 Carpus, 3318b.
 Carracci, 710b.
 Carrageen, 1836a.
 Carranza, Venustiano, 710b,
 2322b, 3884b.
 Carrara Marble, 710b, 2249a.
 Carrel, Alexis, 711a, 2577b.
 Carriage, 711a.
 Carrier Pigeon, 711b.
 Carroll, Charles, 711b.
 Carrot, 712a.
 Carson, Christopher, 712a.
 Carson, Edward Henry, 712a.
 Carson City, Nev., 712b.
 Cartagena, Colombia, 712b.
 Cartagena, Spain, 712b.
 Carte Blanche, 713a.
 Carteret, George, 713a.
 Carthage, 713a.
 Carthage, Mo., 713b.
 Carthusians, 714a.
 Cartier, Georges Etienne, 714a.
 Cartier, Jacques, 714a.
 Cartilage Gristle, 714b.
 Cartilaginous Tissue, 921b.
 Cartoon, 714b.
 Cartouche, 714b.
 Cartridge, 715a.
 Cartwright, Edmund, 715a.
 Caruso, Enrico, 715a.
 Carver, John, 715b.
 Carving, 715b.
 Cary, Alice and Phoebe, 715b.
 Caryatides, 716a, 1249b.
 Casaba Melon, 716a.
 Casabianca, 716a.
 Casa Grande Ruin, 2742a.
 Cascade, 723a.
 Cascade Range, 716a.
 Cascade Tunnel, 716b.
 Cascara, 716b.
 Cascarilla, 716b.
 Casco Bay, 716b.
 Casein, 716b.
 Cashmere, 1932b.
 Cashmere Goat, 717a.
 Cash Register, 717a.
 Casimir-Perier, Jean Paul
 Pierre, 717a.
 Caspian Sea, 717b.
 Cass, Lewis, 717b.
 Cassandra, 717b.
 Cassava, 718a.
 Cassell, Germany, 718a.
 Cassia, 718a.
 Cassino, 718a.
 Cassiopeia, 718b.
 Cassiterite, 718b, 3583b.
 Cassowary, 719a.
 Cast, 719a.
 Castanets, 719a.
 Caste, 719b.
 Castile, 719b.
 Castile Soap, 3334a.
 Castilloa Tree, 3127a.
 Castle, 719b.
 Castle, Edgerton and Agnes,
 720a.
 Castle Garden, 720b.
 Castor and Pollux, 720b.
 Castor Oil, 720b.
 Cat, 721a.
 Catacombs, 721b.
 Catalepsy, 722a.
 Catalina Island, 722a.
 Catalpa, 722b.
 Catamount, 722b, 3870b.
 Cat and Mouse (game), 1440a.
 Catania, 722b.
 Catapult, 722b.
 Cataract, 723a.
 Cataract (eye), 722b.
 Catarrh, 723a.
 Catawba Indians, 723b.
 Catawba River, 723b.
 Catbird, 723b.
 Catechism, 723b.
 Catechu, 11a, 724a.
 Caterpillar, 724a, 2491a.
 Caterpillar Tractor, 3605b.
 Catesby, Robert, 1596b.
 Catfish, 724b.
 Catgut, 724b.
 Catherine I, 725a.
 Catharine II, 725a, 3095a, 3142b.
 Catharine de' Medici, 725a.
 Catharine of Aragon, 725b,
 1671b.
 Catharine Wheel, 3119a.
 Cathay, 725b.
 Cathedral, 725b.
 Cathode, 1206b.
 Cathode Rays, 726a.
 Catholic Church, 726b.
 Catholic University of Amer-
 ica, 726b.
 Catiline, 726b.
 Catkin, 727a.
 Catnip, 727a.
 Cato, Marcus Porcius, 727a.
 Cato the Elder, 727b.
 Cat's-eye, 727b, 817b.
 Catskill Mountains, 728a.
 Cat's Tail, 3583a.
 Cat-Stitch (game), 1439b.
 Catsup, 1942b.
 Catt, Carrie Chapman, 728a.
 Cat-tail, 728a.
 Cattegat, 728b.
 Cattle, 728b, 3222a.
 Cattle Plague, 3076a.
 Caucasian Rugs, 3130a.
 Caucous, 729b.
 Caucasus, 729b.
 Cauliflower, 729b.
 Caustic, 729b.
 Caustic Potash, 139b.
 Caustic Soda, 3337b.
 Cavalleri, Lina, 729b.
 Cavaliers, 730a.
 Cavalleria Rusticana, 730a,
 2267a.
 Cavalry, 226a, 730a.
 Cave, 730b.
 Caveat, 731a.
 Cave Dwellers, 731a.
 Caviar, 731a.
 Cavite, P. I., 731a.
 Cayour, Count Camillo Benso
 di, 731b.
 Cawnpore, India, 731b.
 Caxton, William, 732a, 2942a.
 Cayenne, French Guiana, 732a.
 Caymans, 98a.
 Cayuga Indians, 732a.
 Cayuga Lake, 732a.
 Cebu, 732b.
 Cecil, William, 732b.
 Cecilia, Saint, 732b.
 Cecropia, 732b.
 Cecrops, 271b, 733a.
 Cedar, 733a.
 Cedar Creek, Battle of, 733a.
 Cedar Mountain, Battle of,
 733b.
 Cedar Rapids, Ia., 733b.
 Celaeno, 2872b.
 Celebes Island, 733b.
 Celery, 734a.
 Celestial Equator, 1248b.
 Celestial Globe, 1523a.
 Celestine (Popes), 734a.
 Celibacy, 734b, 3093b.
 Cell, 734b.
 Cellini, Benvenuto, 735a.
 Cello, 3775a.
 Celluloid, 735a.
 Cellulose, 735a.
 Celts, 735b.
 Cements, 735b, 2776b.
 Cemetery, 736a.
 Cenci, Beatrice, 736b.
 Cenis, Mont, 736b.
 Cenozoic Era, 737a.
 Censer, 737a.
 Censors, 737a.
 Censorship, 737a.
 Census, 737b.
 Cent, 737b.
 Centaur, 738a.
 Centaurus, 738a.
 Centennial Exposition, 738a.
 Centennial State, The, 885a.
 Center of Gravity, 738b, 1556a.
 Centigrade, 3563b.
 Centimeter, 738b.
 Centipede, 739a.
 Central America, 739a.
 Central Falls, R. I., 739b.
 Centralia, Ill., 739b.
 Centralia, Wash., 739b.
 Central Park, N. Y., 2556b.
 Centrifugal Force, 739b, 1372b.
 Centrifugal Pump, 2970a.
 Centripetal Force, 740a, 1372b.
 Cephalopoda, 740a.
 Cephalothorax, 3218b.
 Cerberus, 740a, 2875a.
 Cereals, 3684a.
 Cerebellum, 541b, 740a.
 Cerebro-Spinal System, 2508a.
 Cerebrum, 541b, 740b.
 Ceres, 741a, 2454b, 2950a.
 Cereus, 741a.
 Cerium, 741b.
 Cerro Gordo, Battle of, 741b.
 Certiorari, 3949b.

- Cervantes Saavedra, Miguel de, 741b.
 Cervera y Topete, 742a.
 Cervin, Mont, 2281b.
 Cetacea, 742a.
 Cession, 129b.
 Cettinje, 742b.
 Cevennes, 742b.
 Ceylon, 742b.
 C. G. S. Unit, 2381b.
 Chacma, 310a.
 Chad, Lake, 743a.
 Chadwick, George Whitfield, 743b.
 Chaffinch, 743b.
 Chagres River, 743b.
 Chain, 743b.
 Chain (surveying), 744a.
 Chain-mail, 223b.
 Chain Pump, 2970a.
 Chalcedony, 744a.
 Chaldea, 744a.
 Chaldean-Assyrian Architecture, 163b.
 Chaldee Language, 744a.
 Chaleurs Bay, 744b.
 Chalice, 744b.
 Chalk, 744b.
 Chalk System, 986a.
 Challenger Expedition, 746a.
 Chalons, Battle of, 746a, 1319b.
 Chamberlain (family), 746a.
 Chamber of Commerce, 746b.
 Chamber of Commerce of the U. S., 746b.
 Chambers, Robert W., 747a.
 Chambersburg, Pa., 747a.
 Chambly-Lake Champlain Canal, 679a.
 Chameleon, 747a, 2490a.
 Chaminade, Cecile Louise Stephanie, 747b.
 Chamois, 747b.
 Chamomile, 748a.
 Champagne, 748a.
 Champaign, Ill., 748a.
 Champ de Mars, 748a.
 Champlain, Lake, 748b.
 Champlain, Samuel de, 748b.
 Champs Elysées, 748b, 2737a.
 Chancel, 749a.
 Chancellor, 749a.
 Chancellorsville, Battle of, 749a.
 Chang-Chow, China, 749b.
 Change of Venue, 3753a.
 Channel Islands, 749b.
 Channing, William Ellery, 749b.
 Chantecler, 3120b.
 Chanute, Kans., 750a.
 Chaparral, 750a.
 Chaparral Cock, 3081a.
 Chaplain, 750a.
 Chapleau, Joseph Adolphe, 750a.
 Chapman, George, 750a.
 Chapultepec, Battle of, 750b.
 Charade, 750b.
 Charades, Acting, 1239b, 1442a.
 Charcoal, 750b, 767b.
 Chard, 751a.
 Charge d' Affaires, 751a.
 Charge of the Light Brigade, 751a.
 Chariot, 751a.
 Charity, Bureaus of, 2759a.
 Charity, Sisters of, 751b.
 Charity and Charities, 751b.
 Charlemagne, 752a, 1853a.
 Charles I (Austria-Hungary), 753a.
 Charles I (England), 753b, 3052b.
 Charles II (England), 753b.
 Charles VI (France), 754a.
 Charles VII (France), 754a.
 Charles IX (France), 754a.
 Charles X (France), 754b.
 Charles V (Holy Roman Emperor), 754b.
 Charles VI (Holy Roman Emperor), 755a.
 Charles XII (Sweden), 755a.
 Charles XIV John (Sweden), 755b.
 Charles Martel, 755b, 1394b.
 Charles the Bald, 709a.
 Charles the Bold, 756a.
 Charles the Fat, 1394b.
 Charles the Great, 752a.
 Charleston, S. C., 756a.
 Charleston, W. Va., 756b.
 Charlotte, N. C., 756b.
 Charlotte Adelgonde (Princess), 2191b.
 Charlotte Amalie, V. I., 3776a.
 Charlottenburg, Prussia, 757a.
 Charlottetown, P. E. I., 757a.
 Charon, 757b.
 Chart, 757b.
 Charter, 757b, 829b.
 Charter Oak, 757b.
 Chartism, 758a.
 Chase, Salmon Portland, 758a.
 Chase, Samuel, 1775a.
 Chat, 758a, 3803b.
 Chatham, N. B., 758b.
 Chatham, Ont., 758b.
 Chattahoochee River, 759a.
 Chattanooga, Battles of, 759a.
 Chattanooga, Tenn., 759b.
 Chattel, 760a.
 Chattel Mortgage, 2418b.
 Chatterton, Thomas, 760a.
 Chaucer, Geoffrey, 760a.
 Chaudiere River, 760b.
 Chauffeur, 760b.
 Chautauqua Assembly, 3773b.
 Chautauqua Institution, 760b.
 Check, 761b.
 Checkers, 762a.
 Cheese, 762b.
 Cheese Insects, 763a.
 Cheetah, 763a.
 Chemistry, 763a.
 Chemistry, Bureau of, 51a.
 Chemnitz, Germany, 769a.
 Chenille, 769a.
 Cheops, 769a, 2973b.
 Cherbourg, France, 769a.
 Cherokee Indians, 769b.
 Cherry, 769b.
 Cherry Laurel, 770a.
 Cherry Valley Massacre, 770a.
 Cherub, 770a.
 Chesapeake, The, 770a, 3806a.
 Chesapeake and Ohio Canal, 770b.
 Chesapeake Bay, 770b.
 Chess, 770b.
 Chest, 772a.
 Chester, Eng., 772b.
 Chester, George Randolph, 772b.
 Chester, Pa., 773a.
 Chesterfield, Philip Dormer Stanhope, 773a.
 Chesterton, Gilbert Keith, 773a.
 Chestnut, 773b.
 Chevalier Bayard, 365b.
 Cheviot Hills, 773b, 3220b.
 Chevron, 773b.
 Chewing Gum, 773b.
 Cheyenne, Wyo., 774a.
 Cheyenne Indians, 774a.
 Chicago, Ill., 774b.
 Chicago, University of, 780b.
 Chickadee, 3586b.
 Chickahominy River, 781a.
 Chickamauga, Battle of, 781a.
 Chickamauga National Park, 781a.
 Chickasaw Indians, 781b.
 Chickasha, Okla., 781b.
 Chicken Hawk, 1669b.
 Chicken of the Sea, 3645a.
 Chicken-Pox, 781b, 784a.
 Chicle, 782a.
 Chicopee, Mass., 782a.
 Chicory, 782a.
 Chicoutimi, Que., 782a.
 Chiffon, 782b.
 Chigger, 1896b.
 Chigoe, 1896b.
 Chihuahua, Mex., 782b.
 Chilblain, 782b.
 Child and Parent, 2734b.
 Childe Harold's Pilgrimage, 619b.
 Child Labor, 782b.
 Children, Reading for, 3014a.
 Children, Societies for, 783b.
 Children's Bureau, 783b.
 Children's Crusade, 999a.
 Children's Diseases, 783b.
 Children's Hour, The, 2033b.
 Children's Thinking, 3570b.
 Childs, George William, 786a.
 Child Study, 786a, 2961a.
 Child Training, 787a.
 Child Training Chart, 791a.
 Chile, 793b.
 Chile Con Carne, 795b.
 Chillicothe, O., 795b.
 Chillon, 795b.
 Chills and Fever, 2229a.
 Chimborazo, Mount, 795b.
 Chimera, 795b.
 Chimes, 795b.
 Chimney, 796a.
 Chimpanzee, 796a.
 China, 796b.
 China Painting, 805b.
 Chinatown, 3186a.
 Chinaware, 2906a, 2925b.
 Chinch Bug, 806a.
 Chinchilla, 806b.
 Chinese Immigration, 806b.
 Chinese-Japanese War, 807a.
 Chinese Rugs, 3130a.
 Chinese Turkestan, 3648b.
 Chinese Woolflower, 3910b.
 Chinook (wind), 807b.
 Chinook Indians, 807b.
 Chios, 30a.
 Chipmunk, 807b, 3396a.
 Chippendale, Thomas, 1427b.
 Chippewa Falls, Wis., 807b.
 Chippy, 808a.
 Chiromancy, 2715b.
 Chiron, 31b, 808a.
 Chiropractic Healing, 808a.
 Chiroptera, 808a.
 Chitons, 808b, 1143b.
 Chivalry, 808b.
 Chlamys, 1143b.
 Chloral, 139b, 809a.
 Chlorate, 809a.
 Chloride of Sodium, 3175b.
 Chlorine, 809a.
 Chlorite Schist, 809b.
 Chloroform, 809b.
 Chlorophyll, 809b, 1265a, 2074a.
 Choate, Joseph Hodges, 809b.
 Chocolate, 810a.
 Choctaw Indians, 810a.
 Choice, 3873a.
 Choice of Good Reading, 3012b.
 Choke Damp, 810b.
 Cholera, 810b.
 Cholera Infantum, 810b.
 Cholera Morbus, 810b.
 Chopin, Frederic Francois, 811a.
 Chord, 811a.
 Chorea, 3170b.
 Choroid, 1287a.
 Chorus, 811b.
 Chosen, 811b.
 Chowchow, 2847a.
 Christ, 813b.
 Christchurch, N. Zealand, 813b.
 Christian IV, 3566b.
 Christian IX, 813b.
 Christian X, 813b.
 Christian Catholic Church, 1110a.

Christian Endeavor, The United Society of 4005

Collins, William

| | | |
|---|---|---|
| Christian Endeavor, The United Society of, 814a. | Cities of the United States, Largest, 830a. | Club, 861a. |
| Christian Era, 814a. | Cities of the World, Largest, 829b. | Cluny Lace, 861b. |
| Christiania, Norway, 814a. | Citizen, 828b. | Clyde River, 861b. |
| Christianity, 814b. | Citric Acid, 829a. | Clymene, 2452b. |
| Christians, 1079a. | Citron, 829a. | Clytemnestra, 862a. |
| Christian Science, 814b. | Citrus, 829a. | Coaitia, 2388b. |
| Christiansted, Virgin Islands, 3620b. | City, 829a. | Coal, 862a, 1479a, 2776b, 3677b |
| Christmas, 815b. | City Council, 77b. | Coal Gas, 139b. |
| Christ of the Andes, 121a, 170b. | City Manager, 830b. | Coalition Cabinet, 865b. |
| Christy, Howard Chandler, 815b. | City of Brotherly Love, 2810b. | Coal Tar, 865b. |
| Chromatic, 816b. | City of David, 1889b. | Coastal Plain, 866a, 2864b. |
| Chromatic Aberration, 7a. | City of Homes, 2810b. | Coast and Geodetic Survey, United States, 866a. |
| Chromatic Scale, 3208b. | City of Magnificent Distances, 3813a. | Coast Artillery, 226b. |
| Chromic Iron Ore, 816b. | City Planning, 831a. | Coast Defense, 238b. |
| Chromite, 816b. | Ciudad Juarez, Mex., 832a. | Coast Guard, 866b. |
| Chromium, 816b. | Civet, 832a. | Coasting, 867a. |
| Chromosphere, 3470b. | Civil Death, 832a. | Coast Range, 867b. |
| Chronicles, Books of, 816b. | Civil Engineer, 1225b. | Coati, 867b. |
| Chronology, 817a. | Civil Government, 832b. | Cobalt (metal), 867b. |
| Chronometer, 817a. | Civil Law, 834a. | Cobalt, Ont., 868a. |
| Chrysalis, 616a, 817a. | Civil List, 834a. | Cobb, Irwin Shrewsbury, 868a. |
| Chrysanthemum, 817b. | Civil Service, 834b. | Cobden, Richard, 868a. |
| Chrysoberyl, 817b. | Civil Service in Canada, 836b. | Cobequid Mountains, 2614a. |
| Chrysolite, 817b. | Civil War in America, 837a, 3710b. | Coblenz, Germany, 868b. |
| Chrysoprase, 817b. | | Cobless Corn, 951a. |
| Chub, 818a. | Claiborne's Rebellion, 841b. | Cobourg, Ont., 868b. |
| Chuquisaca, Bolivia, 3460a. | Clairvoyance, 841b. | Cobra, 868b. |
| Church, 818a. | Clam, 841b. | Cobwebs, 869a. |
| Church, Frederick Edwin, 818a. | Clan, 842a. | Cocaine, 139b, 869a. |
| Churchill, Winston, 818a. | Clarendon, Edward Hyde, 842b | Coccus, 869a. |
| Churchill, Winston Leonard Spencer, 818b. | Claret, 842b. | Cochin-China, 869a. |
| Churchill River, 819a. | Clarinet, 842b. | Cochineal, 869b. |
| Church of Jesus Christ of Latter Day Saints, 2413a. | Clark, Champ, 843a. | Cochlea, 1163b. |
| Church of the Holy Sepulcher, 1889a. | Clark, Francis Edward, 843a. | Cockatoo, 869b. |
| Church of the Latter Day Saints, 3327b. | Clark, George Rogers, 843b. | Cockburn Island, 2241b. |
| Churn, 819a. | Clark, William, 843b. | Cockchafer, 870a. |
| Churning, 614a. | Clarksburg, W. Va., 843b. | Cockfighting, 870a. |
| Churubusco, Battle of, 819a. | Clark University, 844a. | Cockle, 870a. |
| Chyle, 819a, 1076a. | Classification, 844a. | Cocklebur, 870a. |
| Chyme, 819b, 1075b. | Claudius, 844a. | Cock of the Wood, 693b. |
| Cicada, 819b. | Clavicle, 3317b. | Cockroach, 870a. |
| Cicely, 820a. | Claxton, Philander Priestley, 844a. | Cocoa, 628a, 869a. |
| Cicero, Marcus Tullius, 820a. | | Cocoanut, 870b. |
| Cid, The, 962a, 820b, 3371b. | Clay, 844b, 2924b. | Cocoons, 724b. |
| Cider, 821a. | Clay, Henry, 844b. | Cod, 871a. |
| Cienfuegos, Cuba, 821a. | Clayton-Bulwer Treaty, 845b. | Code Napoleon, 871b, 2471a. |
| Cigar, 821a, 3588b. | Cleanliness, 1101b. | Code of Signals, International, 3300a. |
| Cigarette, 821a. | Clearing House, 845b. | Code Writing, 871b. |
| Cilia, 822a. | Cleavage, 846a. | Codicil, 3874b. |
| Cimbri, 822a. | Cleaveland, Moses, 2642a. | Codling Moth, 872a. |
| Cimmerian Bosphorus, 510b. | Cleburne, Tex., 846b. | Cod-liver Oil, 872a. |
| Cinchona, 822a, 2990a. | Cleft Grafting, 1544b. | Cody, William Frederick, 872b. |
| Cincinnati, Ohio, 822b. | Clematis, 846b. | Coeducation, 872b. |
| Cincinnati, Society of the, 824a. | Clemenceau, Georges Benjamin Eugene, 846b. | Coelenterata, 872b. |
| Cincinnati, University of, 824a. | Clemens, Samuel Langhorne, 847b. | Coeur d' Alene, Ida., 873a. |
| Cincinnatus, Lucius Quintus, 824b. | Clement (Popes), 848a. | Coffee, 873a. |
| Cincinnatus of the West, 824b. | Cleopatra, 848b. | Cofferdam, 874b. |
| Cinderella, 824b, 2791a. | Cleopatra's Needles, 849a, 2556b. | Coffeyville, Kans., 874b. |
| Cineraria, 825a. | Clermont, The, 1424a, 3282b. | Coffin, 875a. |
| Cinna, Lucius Cornelius, 825a. | Cleveland (Stephen) Grover, 849b. | Cognomen, 2467a. |
| Cinnabar, 825a. | Cleveland, Ohio, 853a. | Cohan, George Michael, 875a. |
| Cinnamon, 825a. | Click Beetle, 854b, 3896a. | Coherer, 3532a. |
| Cintra, Convention of, 3846b. | Cliff Dwellers, 855a. | Cohesion, 875a, 3537b. |
| Circassia, 825b. | Climate, 855b. | Cohoes, N. Y., 875b. |
| Circe, 825b. | Clinton, De Witt, 856a. | Cohorts, 2928b. |
| Circle, 208b, 825b, 2299a. | Clinton, George, 856b. | Coining, 875b. |
| Circuit Court of Appeals, 975a. | Clinton, Henry, 856b. | Coins, Foreign, 876a. |
| Circulation of the Blood, 826a, 2842a. | Clinton, Ia., 857a. | Coir, 877a. |
| Circumference, 825b. | Clisthenes, 271b, 857a. | Coit, Dr. Stanton, 3336a. |
| Circus, 826b. | Clive, Robert, 857a. | Coke, 877a, 2776b. |
| Circus Maximus, 3096b. | Cloaca Maxima, 555a, 857b. | Coke, Edward, 877a. |
| Cirrhosis, 828a, 3218b. | Clock, 857b. | Colchicum, 877b. |
| Cisalpine Gaul, 1455a. | Closed Shop, 858b. | Cold Harbor, Battles of, 877b. |
| Cisalpine Republic, 828a. | Clotbur, 870a. | Cold Storage, 877b. |
| Cistercians, 828a. | Cloth, 858b. | Cold Wave, 878a. |
| Cistern, 828b. | Clothes Moth, 859a. | Coleridge, Samuel Taylor, 878a. |
| Cities, Growth of, 2905a, 3690b. | Clotho, 859a, 1302a. | Coleridge-Taylor, Samuel, 878b. |
| Cities of Canada, Largest, 830b. | Cloud, 859a. | Colfax, Schuyler, 879a. |
| Cities of Refuge, 828b. | Cloud-burst, 860b. | Colic, 879a. |
| | Clover, 860b. | Coligny, Gaspard de, 879a. |
| | Cloves, 860b. | Collateral, 879a. |
| | Clovis, 861a, 1394b. | College, 879b, 3720a. |
| | | College of Cardinals, 3152b. |
| | | Collegiate Institute, 879b. |
| | | Collie, 879b, 1089b. |
| | | Collingwood, Ont., 880a. |
| | | Collins, William, 880a. |

- Collins, [William] Wilkie, 880a.
 Collodion, 880a.
 Colocasia, 880b.
 Cologne, 880b.
 Colombia, Republic of, 881a.
 Colombo, Ceylon, 882a.
 Colon, 882a.
 Colon (physiology), 882b.
 Colonel, 882b.
 Colonel Carter of Cartersville, 3326b.
 Colonial Period, 3689a.
 Colonies and Colonization, 882b, 3701a.
 Color, 884b.
 Colorado, 885a.
 Colorado, University of, 888b.
 Colorado Beetle, 2923b.
 Colorado River, 889a.
 Colorados, 3723b.
 Colorado Springs, Col., 889a.
 Color Blindness, 889b.
 Colored Pencils, 2772a.
 Color Lithography, 2141b.
 Color Photography, 2827b.
 Color Printing, 2941b.
 Colosseum, 889b.
 Colossus, 890a.
 Colossus of Rhodes, 890a.
 Colt, Samuel, 3057b.
 Colt's Tail, 1345b.
 Columbia, Mo., 890b.
 Columbia, Pa., 890b.
 Columbia, S. C., 890b.
 Columbia River, 891a.
 Columbia River Highway, 891a.
 Columbia University, 891b.
 Columbine, 892a.
 Columbus, Christopher, 892a.
 Columbus, Ga., 894b.
 Columbus, Ind., 894b.
 Columbus, Miss., 894b.
 Columbus, Ohio, 894b.
 Columbus Day, 2633b.
 Column, 895a.
 Columns, Hall of, 3260b.
 Comanche Indians, 896b.
 Combustion, 896b, 2695b.
 Comedy, 897a, 1115a.
 Comenius, John Amos, 897a.
 Comets, 897a.
 Comic Opera, 898a.
 Comitia, 898a.
 Commander, 898b.
 Commencement, 898b.
 Commentaries on American Law, 1936a.
 Commerce, 898b.
 Commerce, Chamber of, 746b.
 Commerce, Department of, 899a.
 Commerce in the United States, 3688a.
 Commercial Agency, 899a.
 Commercial Geography, 1462a.
 Commercial Law, 899b.
 Commissioned Officers, 228a.
 Commissioner of Education, 1183a.
 Commission Form of Government, 899b.
 Committees of Congress, 915b.
 Committees of Correspondence, 899b.
 Committees of Parliament (Canada), 2746b.
 Committees of Public Safety, 1416b.
 Commodore, 900a.
 Commodus, 3104a.
 Common Carrier, 900a.
 Common Council, 829b, 900b.
 Common Law, 900b, 2066b.
 Common Schools, 900b.
 Commonwealth of England, 902a, 3052b.
 Commune, 902a, 1061a.
 Commune of Paris, 902a.
 Communism, 902b, 3335a.
 Community Center, 902b.
 Commutator, 1160a.
 Como, Italy, 903a.
 Como, Lake, 903a.
 Comoro Islands, 903b.
 Company, 226b.
 Comparative Philology, 2820a.
 Compass, 903b.
 Compasses, 904a.
 Compass Plant, 904a.
 Compleat Angler, The, 3801a.
 Complement (grammar), 2048a.
 Complementary Air, 549b.
 Complementary Colors, 885a.
 Composite Family, 904b.
 Composite Order, 895b.
 Composition (art), 1118a.
 Composition of Forces, 905a.
 Compositions, 2036b.
 Composition Work, 2032b, 2045a, 2047a, 2051a, 2056a.
 Compound Engine, 3414b.
 Compounds, Chemical, 764b.
 Compressed Air, 905a.
 Compromise of 1850, 905a.
 Comptroller, 905b.
 Compulsory Education, 905b.
 Comte, Auguste, 906a, 1165a, 3336b.
 Concentrate, 2309a, 3309a.
 Conception, Chile, 906b.
 Concept, 906b.
 Concertina, 907a.
 Conch, 907a.
 Concha, 1163a.
 Conclave, 907b.
 Concord, Mass., 907b.
 Concord, N. H., 907b.
 Concordance, 907b.
 Concordat, 908a.
 Concrete, 908a.
 Concrete Bridge, 557b.
 Condensation, 908b.
 Condensed Milk, 2339a.
 Condor, 908b.
 Conduction, 1657a.
 Conductors, 1201a.
 Conduit System, 1206a.
 Cone, 909a.
 Conemaugh Lake, 2779a.
 Coney Island, 909a.
 Confederacy, United Daughters of the, 909b.
 Confederacy of Delos, 272a.
 Confederate States of America, 909b.
 Confederate Veterans, United, 911a.
 Confederate Veterans, United Sons of, 911a.
 Confederation, Articles of, 911b, 3704b.
 Confederation of the Rhine, 911b.
 Confessions of an English Opium Eater, 1061b.
 Confucius, 912a.
 Conglomerate, 911b.
 Congo, 912b.
 Congo Free State, 1413a.
 Congo River, 913a.
 Congregationalists, The, 913a.
 Congregation of the Index, 1779a.
 Congress, 913b.
 Congressional Record, 914a.
 Congressman-at-large, 914a.
 Congress of Mothers, National, 914a.
 Congress of the United States, 914b.
 Congress of Vienna, 3771b.
 Congreve, William, 916b.
 Coniferae, 916b.
 Conjunction (astronomy), 917a.
 Conjunction (grammar), 917a.
 Conjunctivitis, 917a.
 Conkling, Roscoe, 917b.
 Connaught, Arthur William Patrick Albert, 917b.
 Conneaut, Ohio, 918a.
 Connecticut, 918a.
 Connecticut River, 921b.
 Connective Tissue, 921b.
 Connellsville, Pa., 922a.
 Consanguinity, 3045a.
 Conscription, 922a.
 Conservation, 923a.
 Conservative, 923b.
 Conservatory, 515b, 923b.
 Console, 923b.
 Consolidated Schools, 3214a.
 Consonant, 923b, 2683a.
 Consort, 924a.
 Conspiracy, 924a.
 Constable, 924a.
 Constance, Council of, 3299b.
 Constance, Lake, 924a.
 Constantine, Arch of, 924b.
 Constantine, Caius Flavius, 924b.
 Constantine I, 924b.
 Constantinople, Turkey, 925a.
 Constellations, 926a.
 Constipation, 926b.
 Constitution, 926b.
 Constitution, Adoption of the, 3706a.
 Constitution, The, 927a.
 Constitutional Law, 2067a.
 Constitutional Union Party, 927b, 2888a, 2890b.
 Constitution of the United States, 109b, 927b.
 Consul, 935b.
 Consumption (economics), 936a.
 Contagious Diseases, 936a.
 Contempt, 936a.
 Contiguity, The Law of, 2295b.
 Continental Islands, 1847b.
 Continental Shelf, 2592b.
 Continental System, 936a.
 Continuation Schools, 936b, 3785b.
 Contraband of War, 936b.
 Contract, 937a.
 Contract Labor Law, 937b.
 Contradiction, Law of, 3570b.
 Contralto, 3311b.
 Convection, 1657a.
 Converter, 3418a.
 Convict Labor, 938a.
 Convolvulus, 938a.
 Convulsion, 938b.
 Conway, Thomas, 939a.
 Conway, Cabal, 938b.
 Cony, 2852a.
 Cook, Frederick A., 2604b.
 Cook, James, 939a, 1645a, 3366b.
 Cookery, 939a.
 Cook's Expedition, 2604b.
 Coolidge, Calvin S., Vice President, 939b.
 Coon, 2993a.
 Cooper, James Fenimore, 939b.
 Cooper, Peter, 940a.
 Cooperage, 940b.
 Cooperation, 941a.
 Cooper Union, 941b.
 Coosa River, 941b.
 Coot, 941b.
 Copal, 941b.
 Copenhagen, Denmark, 942a.
 Copernicus, Nicholas, 942b.
 Copley, John Singleton, 942b.
 Copper, 942b, 3678b.
 Copperas, 943b, 3467b.
 Copper Carbonate Solution, 1806b.
 Copper Glance, 943b.
 Copperhead, 943b.
 Coppermine River, 944a.
 Copper River, 66a.
 Copper Sulphate, 3467b.
 Copra, 944a.
 Copts, 944a.
 Copy-hold, 3772b.

Copying Devices, 944a.
 Copyright, 945a.
 Coquelin (family), 946a.
 Coral, 946a.
 Corbel, 947a.
 Corcoran, William Wilson, 947a.
 Corcoran Art Gallery, 947a.
 Cordage, 3116a.
 Corday d'Armout, Marie Anne Charlotte, 947b.
 Cordillera, 947b, 2584a, 3088b.
 Cordite, 947b, 3329a.
 Cordoba, Argentina, 947b.
 Cordovan, 2073a.
 Corduroy, 948a.
 Corea, 948a.
 Corelli, Marie, 948a.
 Coriander, 948a.
 Corinth, Greece, 948a.
 Corinth, Miss., 948b.
 Corinthian Order, 895b.
 Corinthians, Epistles to the, 948b.
 Coriolanus, 949a.
 Cork, 949a, 2489b, 2862a.
 Cork, Ireland, 949b.
 Corliss, George Henry, 949b.
 Corm, 950a.
 Cormorant, 950a.
 Corn, 950b, 2488a.
 Corn-Adonis, 27b.
 Corn Clubs, 953b.
 Corn Crake, 2998a.
 Cornea, 1287a.
 Corneille, Pierre, 962a.
 Cornelian, 708a.
 Cornell, Ezra, 962a.
 Cornell University, 962a.
 Cornet, 962b.
 Cornflower, 962b.
 Cornice, 1238a.
 Corning, N. Y., 962b.
 Corn Laws, 962b.
 Corn Marigold, 817b.
 Corns, 963a.
 Corn Song, The, 2034a.
 Cornucopia, 963a.
 Cornwall, Ont., 963a.
 Cornwallis, Charles, 963b.
 Coralla, 519a, 963b, 1354a.
 Corona, 963b, 1617b, 3470b.
 Coronado, Francisco, 963b.
 Coroner, 964a.
 Coronet, 964a.
 Corot, Jean Baptiste Camille, 964a.
 Corporal, 964b.
 Corporal Punishment, 964b.
 Corporation, 964b.
 Corporations, Holding, 3641b.
 Corpus Christi, Tex., 965b.
 Coruscles, Tactile, 3602a.
 Corpus Juris Civilis, 1920b.
 Correggio, Antonio Allegri, 965b, 2704b.
 Correlation, 965b.
 Correspondence Schools, 3214a.
 Corrosive Sublimate, 139b, 965b.
 Corrupt Practice Acts, 966a.
 Corset, 966a.
 Corsica, 966a.
 Corsicana, Tex., 966b.
 Cortes, 3372b.
 Cortez, Hernando, 966b.
 Cortland, N. Y., 967a.
 Corundum, 967a.
 Corus, 31a.
 Coshocton, Ohio, 967a.
 Cosmetics, 967a.
 Cosmos, 967b.
 Cossacks, 967b.
 Costa Rica, 968a.
 Coster, Laurens, 2942a.
 Costs, Bill of, 432a.
 Costume, 1143a.
 Cotes, Sarah Jeannette, 968b.
 Cotillion, 1025a.

Cotopaxi, 968b.
 Cotton, 968b, 3684b.
 Cotton, John, 971b.
 Cotton Gin, 972a, 1823a.
 Cottonseed Products, 972a.
 Cotton State, The, 57b.
 Cottonwood, 972b, 2904a.
 Cotyledon, 972b, 1503b.
 Cougar, 2726b, 2969a.
 Cough, 973a.
 Coulee, 1687a.
 Council, City, 2434a.
 Council Bluffs, Ia., 973a.
 Council of Chalcedon, 2900b.
 Council of Trent, 3631b.
 Count (title), 973a.
 Counterfeiting, 973a.
 Counterpoint, 973b.
 Counter-Reformation, 973b.
 Countersign, 974b.
 Countess, 1165a.
 Counting, 2619b.
 Count of Monte Cristo, 2400b.
 County, 974b, 3695a.
 County Agent, 1299a.
 County Attorney, 1083a.
 Coup de Grace, 3859b.
 Coupon Bonds, 498a.
 Courland, 974b.
 Court, 975a.
 Court Fool, 976a, 1890b.
 Court-martial, 976a.
 Court of Claims, 975a, 976b.
 Court-plaster, 976b.
 Courtship of Miles Standish, 77b, 976b, 2432a, 3403a.
 Covenant, 977a.
 Coverters, 977a.
 Coventry, Eng., 977a.
 Coverdale, Miles, 977b.
 Coverley, Roger de, 23b.
 Covington, Ky., 977b.
 Cow, 1019b.
 Cowage, 978a.
 Cowbird, 977b.
 Cowdery, Oliver, 2413a.
 Cowitch, 978a.
 Cow Parsnip, 978a.
 Cowpea, 978a.
 Cowpens, Battle of the, 978a.
 Cowper, William, 978b.
 Cowpox, 979a, 3731a.
 Cowrie, 979a.
 Cowslip, 979a.
 Cox, James, 979b.
 Cox, Palmer, 979a.
 Coyote, 979b.
 Crab, 979b.
 Crab Apple, 979b.
 Cracow, 980a.
 Craigie, Pearl Richards, 980a.
 Craddock, Charles Egbert, 2436a.
 Cradle of American Liberty, 1297a.
 Cradle of New France, 2985a.
 Craik, Dinah Maria Mulock, 980b.
 Cranberry, 980b.
 Crane (bird), 981a.
 Crane (machine), 980b.
 Crane, Stephen, 981b.
 Crane, Walter, 981b.
 Crane Express, The (story), 1961b.
 Crane's Bill, 1491a.
 Cranford, 1453a.
 Cranial Nerves, 2507b.
 Cranmer, Thomas, 981b, 1671b.
 Crannog, 2008a.
 Cranston, R. I., 982a.
 Crantara, 1319a.
 Crape, 982a.
 Crassus, Marcus Licinius, 982a.
 Crater Lake National Park, 2742a.
 Crawfish, 982a.
 Crawford, Francis Marion, 982b.

Crawford, Thomas, 982b.
 Crawford Notch, 3866a.
 Crawfordsville, Ind., 982b.
 Crayfish, 982a.
 Crayons, 983a.
 Creamery, 983a.
 Cream of Tartar, 983b.
 Cream Separator, 983b.
 Creasy, Edward Shepherd, 983b.
 Crecy, France, 983b.
 Credit, 984a.
 Credit Mobilier, 984b, 3711b.
 Creed, 984b.
 Cree Indians, 984b.
 Creek Indians, 985a.
 Creeper, 985a.
 Crefeld, Germany, 1994b.
 Cremation, 985b.
 Creole, 985b.
 Creole State, The, 2173a.
 Creosote, 985b.
 Crepe, 982a.
 Crescent, 985b.
 Crescent City, 986a, 2542a.
 Cress, 986a.
 Cretaceous System, 986a.
 Crete Island of, 986a.
 Cretonne, 986b.
 Cribbage, 986b.
 Crichton, James, 987a.
 Cricket (athletics), 987b.
 Cricket (insect), 987a, 2488b.
 Crime, 988a.
 Crimea, 988b.
 Crimean War, 988b.
 Criminology, 988a.
 Crinoidea, 989b.
 Crinoline, 989b.
 Cripple Creek, Col., 989b.
 Crittenden, John Jordon, 990a.
 Crittenden Compromise, 989b.
 Croatia, 990a.
 Crockett, David, 63a, 990b.
 Crocodile, 990b.
 Crocodile Bird, 991a.
 Crocus, 991a.
 Croesus, 991a.
 Croix de Guerre, 991a.
 Cromwell, Oliver, 991b.
 Cromwell, Thomas, 992b.
 Cronstadt, Russia, 1995a.
 Crookes, William, 992b.
 Crookes Tubes, 993a.
 Crops, Measures for, 2302a.
 Croquet, 993a.
 Crore, 3134b.
 Crosby, Fanny, 993b.
 Cross, 993b.
 Crossbill, 994a.
 Cross Fertilization, 994a.
 Crossing (botany), 603b.
 Croton, 994b.
 Croton Aqueduct, 995a.
 Croup, 995a.
 Crow, 995b.
 Crow Blackbird, 996a.
 Crowfoot, 614b.
 Crow Indians, 996a.
 Crown (coin), 996a.
 Crown (of royalty), 996a.
 Crown Colony, 565b.
 Crown Grafting, 1544b.
 Crown Point N. Y., 996a.
 Crow's Nest Pass, 73a, 561a.
 Crucible Steel, 3417b.
 Cruciferae, 2445b.
 Crucifixion, The, 996b.
 Cruelty to Animals, 996b.
 Cruelty to Children, 997a.
 Cruiser, 2497a.
 Crusades, 997a, 2803b.
 Crustacea, 999b.
 Cryolite, 999b.
 Crypt, 999b.
 Cryptogamous Plants, 1000a.
 Cryptogams, 516b, 518a, 2808a.
 Crystalline Lens, 1287b.
 Crystalline Rocks, 1000a.

Crystallization, 1000a.

Ctesiphon, 31a.

Cuba, 1000b.

Cube, 1004b.

Cubebs, 1004b.

Cube Root, 1005a.

Cubic Measure, 1006a, 2315b.

Cubist School of Painting, 1006a.

Cubit, 1006b.

Cuckoo, 1006b.

Cucumber, 1007a.

Cucumber Tree, 2220b.

Cufic, 1007a.

Cullom, Shelby Moore, 1007a.

Cumberland, Md., 1007a.

Cumberland Mountains, 1007b.

Cumberland River, 1007b.

Cumberland Road, 1007b.

Cummins, Albert Baird, 1007b.

Cuneiform Inscriptions, 1008a.

Cupellation, 1531a.

Cupid, 1008b, 2958a.

Cupola, 1008b, 1093a.

Curassow, 1008b.

Curculio, 1008b.

Curfew, 1009a.

Curie, Pierre and Marie Sklodowska, 1009a.

Curlew, 1009a.

Curling, 1009a.

Currant, 1009b.

Currency Law of 1913, 334b.

Currie, Arthur W., 1009b.

Curtis, George William, 1010a.

Curtiss, Glenn Hammond, 1010a, 1361b.

Curve, 1010b.

Curzon, George Nathaniel, 1010b.

Cush, 10b.

Cushman, Charlotte Saunders, 1011a.

Custer, George Armstrong, 1011a.

Custis, Martha, 3818b.

Customs Duties, 1011a.

Cut Glass, 1522b.

Cuticle, 3319a.

Cutis, 3319b.

Cutler, Manasseh, 2643b.

Cutlery, 1011b.

Cuttlefish, 1012a, 3254b.

Cutworm, 1012a.

Cuvier, George Leopold Chretien Frederic Dagobert, 1012a.

Cyanide Process, 2309a.

Cyanogen, 1012b.

Cycads, 1012b.

Cyaxares, 311b.

Cyclades, 1012b.

Cyclamen, 1012b.

Cyclometer, 3380b.

Cyclone, 1012b, 3596a.

Cyclopedia, 1224a.

Cyclops, 1013a.

Cylinder, 1013a, 2299b.

Cylinder (art), 1138b.

Cylinder Press, 2943a.

Cymri, 1013b.

Cynics, 1013b.

Cynic School of Philosophy, 1013b.

Cypress, 1014a.

Cyprus, 1014b.

Cyrano de Bergerac, 3120b.

Cyrus, 423b.

Cyrus (the Younger), 1015a.

Cyrus the Great, 1014b, 2795a.

Cystic Duct, 1433b.

Czar, 1015a, 3095a.

Czech, 1015a.

Czecho-Slovak Republic, 301b, 1015b.

Czecho-Slovaks, 2995a.

Czernn, Count, 300b.

Czernowitz, 1016a.

Czolgosz, Leon, 2208a.

D, 1017a.

Dabchick, 1017a.

Dace, 818a, 1017a.

Dachshund, 1017a.

Dactylic Meter, 2311b.

Daddy-long-legs, 1017a.

Daedalus, 1017b.

Daffodil, 1017b, 2474a.

Daffy Dilly, Adventures of, 1243b.

Dago Island, 1017b.

Daguerre, Louis Jacques Mande, 1018a.

Daguerreotype, 1017b, 2417b.

Dahlgren, John Adolph, 1018a.

Dahlia, 1018b.

Dahomey, 1018b.

Dairy and Dairying, 729a, 1019a.

Dairy Cattle, 729a.

Daisy, 517b, 1021a.

Dakin's Solution, 3947b.

Dakota Indians, 3313a.

Dallas, George Miffin, 1021b.

Dallas, Tex., 1021b, 3552b.

Dalles, 1022a.

Dalles, The, Oregon, 1022a.

Dalmatia, 1022a.

Dalmores, Charles, 1022b.

Dam, 1022b.

Damages, 1023a.

Damascus, Syria, 1023a.

Damascus Steel, 1023b.

Damask, 1023b.

Damaskeening, 1023b.

Damocles, 1023b.

Damon and Pythias, 1023b.

Damrosch, Leopold, 1024a.

Damrosch, Walter Johannes, 1024a.

Dan, 1024a.

Dana, Charles Anderson, 1024b.

Dana, James Dwight, 1024b.

Dana, Richard Henry, Jr., 1024b.

Danbury, Conn., 1024b.

Dancing, 1025a.

Dandelion, 1025b, 1357b.

Dandruff, 1025b.

Dandy Horse, 427b.

Dane, Great, 1565a.

Danelagh, The, 85a.

Daniel, 421a, 1026a.

Daniell Battery, 1026a.

Danish West Indies, 1026a, 3776a.

Dante Alighieri, 370a, 1026a.

Danton, Georges Jacques, 1027a.

Dantzic, (city), 1027b.

Danube River, 1027a.

Danville, Ill., 1027b.

Danville, Va., 1027b.

Danzig (city), 1027b.

Daphne, 1028a, 2463a.

Dardanelles, 1028a.

Dare, Virginia, 3781a.

Darien, Gulf of, 1028b.

Darien Scheme, 1029a.

Darius, 423a, 1029a, 2795a.

Darius III, 1029a.

Dark Ages, 1029b.

Dark Continent, 33b.

Darling, Grace Horsley, 1029b.

Darmstadt, Germany, 1029b.

Darnel, 1029b.

Darnley, Henry Stuart, 1030a.

Darter, 1030a.

Dartmouth, N. S., 1030a.

Dartmouth College, 1030a.

Dartmouth College Case, 1030b.

Darwin, Charles Robert, 1030b.

Date, 1031a.

Date Plum, 2796b.

Daudet, Alphonse, 1031b.

D

Daughters of the American Revolution, 1032a.

Dauphin, 1032a.

Davenport, Fanny, 1032a.

Davenport, Ia., 1032a.

David, 417a, 1032b.

David Copperfield, 1072a, 2133a.

Davies, Louis Henry, 1032b.

Davis, David, 1033a.

Davis, Jefferson, 1033a.

Davis, Rebecca Harding, 1033b.

Davis, Richard Harding, 1033b.

Davis, Samuel, 1034a.

Davis Strait, 1034a.

Davitt, Michael, 1034a.

Davy, Humphry, 1034a.

Dawson, George Mercer, 1034a.

Dawson, John William, 1034b.

Dawson, Yukon District, 1034b.

Day, 1034b, 1466a.

Day, William Rufus, 1035b.

Day Fly, 2284b.

Day Is Done, The, 2026b.

Daylight Saving, 1035b.

Day Lily, 1035b.

Days of Grace, 1543b.

Dayton, Alston, 1775b.

Dayton, Ohio, 1035b.

De, 1036a.

Deaconess, 1036b.

Dead-Letter Office, 1036b.

Dead Reckoning, 1037a.

Dead Sea, 1037a.

Deadwood, S. D., 1037a.

Deaf and Dumb, 1037a.

Dearborn, Henry, 1039a.

Death, 1039a.

Death Adder, 3775b.

Death's-head Moth, 1039a.

Death Valley, 507b, 1039a.

Debate, 1039b.

Debenture Bonds, 497b.

Deborah, 1041a.

Debs, Eugene Victor, 1041a.

Debt, 1041b.

Debussy, Claude Achille, 1041b.

Decalogue, 1042a.

Decatur, Ill., 1042a.

Decatur, Stephen, 1042a.

Deccan, 1042b.

December, 1042b.

Decemvirs, 1043a.

Deciduous Trees, 1043a.

Declaration, 1043a.

Declaration of Independence, 1043b.

Declaration of War, 3802b.

Declination, 1045b.

Decline and Fall of the Roman Empire, 1509b.

Decomposition, 1045b, 2972a.

Decorative Design, 1125a.

Decoy, 1046a.

Deduction, 1046a.

Deductive Method, 1046a.

Deductive Philosophy, 2823a.

Deep-sea Fishes, 1331a.

Dee River, 1046b.

Deed, 1046b.

Deer, 1047b.

Deer Mouse, 1887a.

De Facto, 1048a.

Defoe, Daniel, 1048a.

Degeneration, 1048b.

Deglutition, 3479a.

Degree, 1048b.

Degree, Bachelor's, 312a.

Deianira, 1676b.

Deification, 146a.

De Jure, 1049a.

DeKalb, Ill., 1049a.

DeKalb, Johann, Baron, 1049b.

DeKoven, Reginald, 1049b.

Delagoa Bay, 1049b.

Deland, Margaretta Wade Campbell, 1050a.

Delaroche, Paul, 1050a.

Delaware, 1050a.

Delaware, Lord, 1052a, 3779b.

- Delaware, Ohio, 1052b.
 Delaware Bay, 1053a.
 Delaware Indians, 1052b.
 Delaware River, 1053a.
 Delaware Water Gap, 1053a.
 Delcassé, Théophile, 1053a.
 Delft, Netherlands, 1053a.
 Delhi, India, 1053b.
 Delian League, 272a.
 Deliberation, 3873a.
 Delilah, 1054a, 3182a.
 Delirium, 1054a.
 Delirium Tremens, 1054a.
 Deliverance of Saint Peter, 2705a.
 Delos, 1054a.
 Delphi, 1054a.
 Delsarte, François Alexandre, 1054b.
 Delta, 1054b, 3080a.
 Deluge, 1055a.
 Demarcation, Line of, 1055a.
 Dementia, 1805b.
 De Mille, James, 1055a.
 Democracy, 1542a.
 Democratic Donkey, 2476a.
 Democratic Party, 1055b, 2887a.
 Democratic-Republican Party, 2887a, 3052a, 3706b.
 Demosthenes, 1056a.
 Demotic Writing, 1684a.
 Demurrer, 1056a.
 Denarius, 1056a, 2781a.
 Denatured Alcohol, 76a.
 Denison, Tex., 1056b.
 Denmark, 1056b.
 Denmark's Colonies, 884b.
 Density, 1059a.
 Dental Schools, 1059a.
 Dentiphone, 282a.
 Dentistry, 1059b.
 Denver, Colo., 1060a.
 Denver, University of, 1061a.
 Department, 1061a.
 Department of the Navy, 2497b.
 Department of State, 3410a.
 Department of War, 3803a.
 De Pauw University, 1061a.
 Depew, Chauncey Mitchell, 1061a.
 Depth of Oceans, 2631b.
 DeQuincey, Thomas, 1061a.
 Derby, Eng., 1061b.
 Dermis, 3319b.
 Der Ring des Nibelungen, 3795a.
 De Reszke (family), 1061b.
 Derrick, 1062a.
 Dervish, 1062a.
 Descartes, René, 1062b.
 Descending Colon, 5b.
 Descent from the Cross, The, 3074a, 3128a.
 Deschanel, Paul, 1062b.
 Desert, 1062b.
 Deserted Village, 1533b.
 Desire, 3873a.
 Des Moines, Ia., 1063a.
 Des Moines Plan, 1063a.
 Des Moines River, 1063b.
 DeSoto, Fernando, 1063b.
 Destinn, Emmy, 1063b.
 Detector, 3532a.
 Determinism, 1301b.
 Detroit, Mich., 1064a.
 Detroit River, 1065b.
 Deucalion, 1066a.
 Deuteronomy, 1066a.
 Deutsch, 1493b.
 Devil, 1066a.
 Devil Fish, 1066b.
 Devil's Darning Needle, 1111a.
 Devil's Horse, 3797b.
 Devils Lake, N. D., 1066h.
 Devil Worship, 1066b.
 Devonian Period, 1066b.
 Devonian System, 1067a.
 Devonshire, Victor Christian William Cavendish, 1067a.
 Dew, 1067b.
 Dewey, George, 1068a.
 Dewey, John, 1068b.
 Dewey, Melvil, 1068b.
 Dextrin, 1068b.
 Diabase, 1068b.
 Diabetis, 1069a.
 Diacritical Marks, 2681a.
 Diagonal Scale, 1069a.
 Dialect, 1069b.
 Diameter, 825b.
 Diamond, 461a, 767b, 1069b.
 Diamond Head, 3617a.
 Diana, 1070b.
 Diaphragm, 1071a.
 Dias, Bartholomeu, 1071a.
 Diatom, 1071a.
 Diatonic Scale, 3208a.
 Diaz, Porfirio, 1071a, 2322a.
 Dibasic Acid, 14a.
 Dice, 1071b.
 Dickcissel, 1071b, 3376b.
 Dickens, Charles, 435a, 1072a.
 Dicotyledons, 517a, 518b, 972b.
 Dictator, 1073a.
 Dictionary, 1073a.
 Dictograph, 1074a.
 Didactic Poetry, 1074a.
 Dido, 30b, 1074a.
 Die, 1074b.
 Dielectric, 1074b.
 Die-sinking, 1074b.
 Diet, 1075a.
 Diet (meeting), 1075a.
 Diet of Worms, 3040a.
 Diffraction, 1075a.
 Diffusion, 1075b.
 Digestion, 1075b, 1367b.
 Digit, 1076a, 3318b.
 Digitalis, 1388a.
 Dike, 1076a.
 Dillon, John, 1076a.
 Dime, 1076b.
 Dimeter (in poetry), 2311b.
 Dimity, 1076b.
 Dingley Bill, 1076b, 3516b.
 Dingo, 1076b.
 Dinosauria, 1076b.
 Dinwiddie, Robert, 1077a.
 Diocletian, 1077a.
 Diogenes, 1077a.
 Diomedes, 1077a.
 Dionaea, 3753b.
 Dionysius, the Elder, 1077b.
 Dip, 1077b.
 Diphtheria, 784a, 1077b.
 Diphthong, 1078a, 2682b.
 Diplodocus, 1077a.
 Diplomacy, 1078a.
 Dipper, 1078b.
 Dipping Needle, 1078b.
 Dipsomania, 1079a.
 Diptera, 1360a.
 Directory, 1079a.
 Dirigible Balloons, 1364b.
 Disarmament, 229b.
 Disciples of Christ, 1079a.
 Discipline, 791a.
 Discobolus, 1079b, 3230b.
 Discount, 1079b.
 Discus, Throwing the, 274b, 1079b, 3231a.
 Disease, 1079b.
 Diseases of Plants, 1080a.
 Disinfectants, 1080b.
 Dispensary, 1081a.
 Dispensation, 1081a.
 Displacement, 3283a.
 Disraeli, Benjamin, 1081a.
 Distemper (disease), 1081b.
 Distillation, 1081b.
 Distilled Liquors, 1082b.
 Distinguished Service Cross, 1082b.
 Distinguished Service Medal, 1083a.
 District Attorney, 1083a.
 District of Columbia, 1083b.
 Diver, 1084a.
 Divide, 1084b, 3830b.
 Dividers, 904a.
 Dividend, 1084b.
 Divination, 1085a.
 Divine Comedy, The, 1026b.
 Divine Right of Kings, 1085a.
 Diving, 1085a, 3486a.
 Diving Beetle, 3226a.
 Divining Rod, 1085b.
 Division (army), 227a.
 Divorce, 1085b.
 Dixie, 1086a.
 Dixie Highway, 1086a.
 Dixon, Thomas, 1087a.
 Dnieper, 1087a.
 Dniester, 1087a.
 Dobrudja, 1087a.
 Dock, 1087b.
 Dockyards, 1088a.
 Dodder, 520b, 1088a.
 Dodgson, Charles Lutwidge, 1088b.
 Dodo, 1088b.
 Dog, 1089a, 2489b, 2490a, 3981a.
 Dogbane, 1091a.
 Dog Days, 1091b.
 Doge, 1091b, 3752a.
 Dogfish, 1091b.
 Doggerbank, 1091b.
 Dogma, 1091b.
 Dog of the Forest, 2083b.
 Dogstar, 1089a.
 Dog-tooth Violet, 1092a.
 Dogwatch, 1092a.
 Dolci, Giovanni de, 3314b.
 Doldrums, 1092a.
 Dole, Sanford Ballard, 1092a, 1645b.
 Doll, 1092a.
 Doll, A Discarded, Speaks on a Christmas Day, 3558b.
 Dollar, 1092b.
 Dollar Diplomacy, 3502b.
 Dolomite, 1092b.
 Dolphin, 1093a.
 Dombey & Son, 2384a.
 Dome, 1093a.
 Domenichino, 1093b.
 Dome of the Rock, 1889a, 3537b.
 Domesday Book, 1093b.
 Domestic Commerce, 3688a.
 Domestic Science, 1094a.
 Dominica, 1104b, 3621b.
 Dominicans, 1105a.
 Dominion Day, 1105a, 1915b.
 Dominion Lands, 2014b.
 Dominion Notes, 2376a.
 Dominion of Newfoundland, 2527b.
 Dominion of New Zealand, 2562b.
 Dominion Parliament, 2744a.
 Dominoes, 1105a.
 Domitian, 1105b.
 Dom Pedro II, 547a.
 Donatello, 1105b.
 Donati's Comet, 898a.
 Donato, 1105b.
 Don Cesar de Bazan, 2277b.
 Don Cossacks, 967b.
 Dongola, 1106a.
 Donizetti, Gaetano, 1106a.
 Don Juan, 620a, 1106a.
 Donkey in the Lion's Skin, The, 3432b.
 Donnelly, Ignatius, 1106a.
 Don Quixote, 606b, 1106b, 742a.
 Don River, 1105b.
 Dooley, Mr., 1155a.
 Dorcas, 1456b.
 Doré, Paul Gustave, 1106b.
 Dorians, 1106b.
 Doric Order, 895b.
 Dormer Widow, 1106b.
 Dormouse, 1106b.
 Dorr's Rebellion, 1107a.
 Dortmund, Germany, 1107a.
 Dory, 2852a.

Dou, Gerard, 1107a.
 Douai Bible, 1107b.
 Double Acrostic, 15a.
 Double Stars, 1107b.
 Doublet, 1144a.
 Dougherty, D. J., 1107b.
 Doughfaces, 3007b.
 Douglas, Arizona, 1107b.
 Douglas, Stephen Arnold, 1107b, 3395b.
 Douglas, William, 129b.
 Douglas Fir, 2675a.
 Doum Palm, 1108b.
 Douma, 1152b.
 Douro River, 1108b.
 Dove, 1108b.
 Dover, Del., 1109a.
 Dover, Eng., 1109a.
 Dover, N. H., 1109a.
 Dover, Strait of, 1109b.
 Dow, Neal, 1109b.
 Dowager Queen, 2987a.
 Dowden, Edward, 1109b.
 Dower, 1109b.
 Dowie, John Alexander, 1109b.
 Doyle, Arthur Conan, 1110a.
 Drachma, 1110a, 3505a.
 Draco, 271b 1110b.
 Draft, 1110b.
 Drafting, 922a.
 Dragon, 1110b.
 Dragon Fly, 1111a.
 Drainage, 1101a, 1111a.
 Drainage Canal, 1112a.
 Drainage Tubes, 1112b.
 Draisine, 427b.
 Drake, Francis, 1112b.
 Drakensberg Mountains, 1113a, 3610a.
 Drama, 1113a.
 Draper, Andrew Sloan, 1116a.
 Drave, 1116b.
 Dravidians, 1116b, 1780a.
 Drawbridge, 557a.
 Drawing, 1116b.
 Dreadnaught, 2496b.
 Dream, 1142a.
 Dream Life, 2372a.
 Dredging, 1142a.
 Dred Scott Decision, 1142a.
 Dresden, Germany, 1142b.
 Dresden China, 1143a.
 Dress, 1143a.
 Drew, John, 1144a.
 Drexel, Anthony Joseph, 1144b.
 Drexel Institute, 1144b.
 Dreyfus, Alfred, 1144b, 3979a.
 Drift, 1145a.
 Drill (agriculture), 3369a.
 Dromedary, 1145a.
 Dropsy, 1145a.
 Dropwort, 3386b.
 Drowned Valley, 3734a.
 Drowning, Rescuing from, 1145a, 3486a.
 Druggist, 146a.
 Druids, 1145b.
 Drum, 1146a.
 Drummond, Henry, 1146b.
 Drummond, William Henry, 1146b.
 Drummond Island, 2241b.
 Drunkenness, 76b.
 Druses, 1146b.
 Dryads, 1147a, 2625b.
 Dry Battery, 1196a.
 Dryden, John, 1147a.
 Dry Docks, 1088a.
 Dry Farming, 1147b.
 Dry Rot, 1148a.
 Dry Tortugas, 1148a.
 Dual Alliance, 3636a.
 DuBarry, Marie Jeanne Becu, 1148a.
 Dublin, Ireland, 1148a.
 Dublin, University of, 1148b.
 Dubois, Pa., 1148b.
 Dubuque, Ia., 1149a.
 Ducat, 1149a.
 Duchess, 1151b.

Duchy, 1149a.
 Duck, 1149b.
 Duck-billed Platypus, 1150a.
 Ducking Stool, 1150b.
 Duckling, The Ugly, 2025a.
 Ductility, 1150b.
 Duel, 1150b.
 Dufferin and Ava, Frederick Temple Hamilton Blackwood, 1151a.
 Dugong, 1151a.
 Duisburg, Germany, 1151b.
 Duke, 1151b.
 Dukhobors, 1151b.
 Dulcimer, 1151b.
 Duluth, Minn., 1152a.
 Duma, 1152b.
 Dumas (family), 1152b, 1153a.
 Du Maurier, George Louis Palmella Busson, 1153a.
 Dumb-bells, 1153a, 1602a.
 Dum Dum Bullets, 598a.
 Dunaburg, 1153b.
 Dunbar, Paul Laurence, 1153b.
 Duncan, King, 3223b.
 Duncan, Norman, 1153b.
 Dundas, Ont., 1153b.
 Dundee, Scotland, 1154a.
 Dune, 1154a, 1480a.
 Dunedin, New Zealand, 1154a.
 Dunkers, 1154b.
 Dunkirk, France, 1154b.
 Dunkirk, N. Y., 1154b.
 Dunmore, Pa., 1155a.
 Dunne, Finley Peter, 1155a.
 Duns Scotus, John, 1155a.
 Duodenum, 5b, 1822a.
 Dupin, Armantine Lucile Aurore, 3183b.
 Duquesne, Pa., 1155a.
 Dura Mater, 542a.
 Durango, Mex., 1155a.
 Durant, Henry Fowle, 3846a.
 Durban, South Africa, 1155b.
 Durbar, 1155b.
 Durer, Albrecht, 1155b.
 Duress, 1155b.
 Durham, John George Lambton, 1155b.
 Durham, N. C., 1156a.
 Durhams, 728b.
 Duse, Eleanora, 1156a.
 Dusseldorf, Germany, 1156b.
 Dust, 1156b.
 Dutch Colonies, 883a.
 Dutch East Indies, 1157a.
 Dutch Guiana, 1157a.
 Dutch Metal, 1157a.
 Dvina River, 1157b.
 Dvinsk, Russia, 1153b.
 Dvorak, Antonin, 1157b.
 Dwarf, 1157b, 1293b.
 Dwarf Birch, 449a.
 Dwarfing, 1158a.
 Dwight, Timothy, 1158a.
 Dyaks, 1158a.
 Dyeing, 1158a.
 Dynamics, 1159a, 2289b, 3401b.
 Dynamite, 1159b.
 Dynamo, 1159b, 1205a.
 Dynamometer, 1160a.
 Dyne, 1159a, 1160b.
 Dysodile, 1160b.
 Dyspepsia, 1160b.

E

E, 1161a, 2682a.
 Eads, James Buchanan, 1161a, 1893a.
 Eagle (bird), 1161b.
 Eagle (coin), 1162b.
 Eagle (standard), 1162b.
 Eagle Wood, 101b.
 Eames, Emma, 1162b.
 Ear, 1163a.
 Earl, 1165a.
 Early, Jubal Anderson, 1165a.
 Earring, 1165b.

Ear Shell, 2a
 Earth, 1165b, 1479a, 1480b.
 Earth, Origin of the, 1476b.
 Earth Currents, 1168a.
 Earthenware, 2924b, 2925b.
 Earthquake, 1168a.
 Earths, 1169a.
 Earth Shine, 1169a.
 Earthworm, 1169b.
 Earwig, 1169b.
 Easement, 1169b.
 Easter, 1170a.
 Easter Lily, 1170a.
 Eastern Question, 1170a.
 Eastern Republic of Uruguay, 3723b.
 East Flanders, 1344a.
 East India Company, 1170b.
 East Indies, 1170b.
 East Liverpool, Ohio, 1170b.
 Easton, Pa., 1171a.
 East Orange, N. J., 2668a.
 East River, 1171a.
 East Saint Louis, Ill., 1171a.
 Eau Claire, Wis., 1171b.
 Eau de Cologne, 1171b.
 Ebenezer, 1171b.
 Ebers, George Moritz, 1171b.
 Ebert, Friedrich, 1172a, 1502b.
 Ebony, 1172a.
 Eccentric, 1172b.
 Ecclesiastes, 1172b.
 Echidna, 1172b.
 Echinoderms, 1173a, 3405a.
 Echinus, 3244a.
 Echo (mythology), 1173a, 2463b.
 Echo (physics), 1173a.
 Eck, Johann Maier von, 1173b.
 Eclectics, 1173b.
 Eclectic School of Medicine, 1173b.
 Eclectic System, 2822b.
 Eclipse, 1174a.
 Ecliptic, 1166b, 1174b.
 Ecole des Beaux Arts, 1174b.
 Eclogues, 3756a.
 Ecology, 1175a.
 Economics, 1175a.
 Ecuador, 1176a.
 Eczema, 1177b.
 Edda, 1178a.
 Eddy, Clarence, 1178a.
 Eddy, Mary Baker, 814b, 1178a.
 Eden, 1178b.
 Edentata, 1178b.
 Edgar Atheling, 1179a.
 Edict of Nantes, 2469a.
 Edinburgh, Scotland, 1179a.
 Edinburgh, University of, 1180a.
 Edison, Thomas Alva, 1180a, 1823a, 3530a.
 Edmonton, Alberta, 1180b.
 Edom, 1181a.
 Education, 1181a.
 Education, Bureau of, 1182b.
 Education, Pre-Vocational, 3785b.
 Education Association, National, 1183a.
 Education in the United States, 3699a.
 Edward the Confessor, 1183b.
 Edward, The Black Prince, 1183b.
 Edward I, 1183b.
 Edward II, 1183b.
 Edward III, 1184a.
 Edward IV, 1184a.
 Edward V, 1184b.
 Edward VI, 1184b.
 Edward VII, 1184b.
 Edwards, Jonathan, 1185a.
 Eel, 1185a.
 Egbert, 1185a.
 Egg, 1098a, 1185a.
 Eggleston, Edward, 1186a.
 Eggplant, 1186a.
 Eglantine, 1186b, 3484a.

Egmont, Lamoral, 1186b.
 Egoism, 1186b.
 Egret, 1186b.
 Egypt, 1187a.
 Egyptian Architecture, 163b.
 Egyptian Cotton, 969a.
 Egyptian Lotus, 3827a.
 Egyptian Mythology, 2464b.
 Egyptian Sculpture, 3230a.
 Eider Duck, 1150a, 1192a.
 Eiffel, Gustave, 1192b.
 Eiffel Tower, The, 1192a.
 Eight Bells, 384b.
 Ekaterina, Russia, 1192b.
 Eland, 1192b.
 Elasticity, 1193a, 1346a.
 Elba, 1193a.
 Elbe River, 1193b.
 Elberfeld, Germany, 1193b.
 Elburz Mountains, 1193b.
 El Caney, Battle of, 1193b.
 Elder, 1193b.
 Elder Edda, 2567a, 2611a.
 El Dorado, 1194a.
 Elecampane, 1194a.
 Election, 1194a.
 Elective Studies, 1194b.
 Electoral College, 1195a, 2934a.
 Electoral Commission, 1195b, 3582a.
 Electoral Districts (Canada), 2745a.
 Electors, German Imperial, 1195b.
 Electra, 1195b, 2872b.
 Electrical Engineer, 1225b.
 Electrical Fish, 1195b.
 Electric Battery, 1196a.
 Electric Bell, 1198b.
 Electric Car, 304a.
 Electric Clock, 1199a.
 Electric Current, Unit of, 3670b.
 Electric Heating, 1199b.
 Electricity, 1199b.
 Electric Light, 1202b, 1823a.
 Electric Locomotives, 2151a.
 Electric Machine, 1204a.
 Electric Meter, 1204b.
 Electric Motor, 1205a.
 Electric Peak, 3962b.
 Electric Railway, 1205b.
 Electric Ray, 3599a.
 Electric Telephone, 3533b.
 Electro-chemistry, 1206b.
 Electrocution, 1206b.
 Electrodes, 1196a, 1206b.
 Electrolysis, 1206b.
 Electrolyte, 1206b.
 Electro-magnet, 1207a.
 Electro-magnetic, Theory of Light, 1207b.
 Electro-magnetism, 1207b.
 Electrometer, 1208a.
 Electro-motive Force, 1208a.
 Electron Theory, 1200b.
 Electrophorus, 1208b.
 Electroplating, 1208b.
 Electroscope, 1208b.
 Electrotherapy, 1209a.
 Electrotyping, 1209a.
 Elegy, 1209b.
 Elegy Written in a Country Churchyard, 1557a.
 Elements, Chemical, 766b.
 Elephant, 1210a.
 Elephantiasis, 1211a.
 Elephant Seal, 1211a.
 Elephant's Ear, 379b.
 Eleusinian Mysteries, 1211a.
 Elevated Railway, 1211b.
 Elevator, 1211b.
 Elgar, Edward William, 1211b.
 Elgin, Ill., 1212a.
 Elgin, James Bruce, 1212a.
 Elgin Marbles, 1212b.
 Eli, 415a, 1212b.
 Elijah, 419a, 1212b.
 Elimelech, 414a.
 Eliot, Charles William, 1212b.

Eliot, George, 1213a.
 Eliot, John, 1213b.
 Elisha, 1213b.
 Elixir, 1214a.
 Elizabeth, N. J., 1214b.
 Elizabeth, Queen, 1214a.
 Elizabeth City, N. C., 1215a.
 Elk, 1215a.
 Elkhart, Ind., 1215b.
 Elk Island Park, 2743a.
 Elks, Benevolent and Protective Order of, 1215b.
 Ell, 3844a.
 Ellesmere Land, 1216a.
 Elliott, Maxine, 1216a.
 Ellipse, 1216a.
 Ellis Island, 1216a.
 Ellsworth, Annie, 3528b.
 Ellsworth, Ephraim Elmer, 1216b.
 Ellsworth, Oliver, 1216b.
 Elm, 1216b.
 Elman, Mischa, 1217a.
 Elmira, N. Y., 1217a.
 El Paso, Tex., 1217b, 3552b.
 Elsmere, Robert, 3803b.
 Elves, 1293b.
 Elwood, Ind., 1217b.
 Ely, Richard Theodore, 1218a.
 Elyria, Ohio, 1218a.
 Elysium Fields, 1218a.
 Elzevir, 1218a.
 Emancipation Proclamation, 1218b.
 Embalming, 1218b.
 Embargo, 1218b.
 Embargo Act, 1219a, 3707b.
 Embassy, 1219a.
 Embezzlement, 1219a.
 Embossing, 1219b.
 Embroidery, 1219b.
 Embryo and Embryology, 1220a, 1503b.
 Emden, The, 3923b.
 Emerald, 461a, 1220a.
 Emerald Isle, 1220a.
 Emerson, Ralph Waldo, 1220a.
 Emery, 1220b.
 Emetic, 1220b.
 Emetine, 1829a.
 Emigration and Immigration, 1773a.
 Emigres, 1221a.
 Emile, 3124b.
 Eminent Domain, 1221a.
 Emin Pasha, 1221a.
 Emir, 645b.
 Emmet, Robert, 1221b.
 Emotions, 1221b.
 Emperor, 1222a.
 Empire Day, 1222a, 1915b, 2283b.
 Empire State of the South, 1485b.
 Employer's Liability, 1222a.
 Employment Bureau, 1222b.
 Emporia, Kan., 1223a.
 Ems, Germany, 1223a.
 Emu, 457b, 1223a.
 Emulsion, 1223b.
 Enamel, 1223b.
 Encke's Comet, 898a.
 Encyclopedia, 1224a.
 Endicott, John, 1224b.
 Endive, 1224b.
 Endless Screw, 1224b.
 Endocardium, 1656a.
 Endothermic Energy, 13a.
 Endymion, 1224b.
 Enemy, 1225a.
 Energy, 1225a.
 Enfleurage, 1286b, 2788b.
 Engine, 1453a, 3412b.
 Engineer Corps, 226a.
 Engineering, 1225a.
 England, 1226a.
 England, Church of, 1235b.
 English Channel, 1236a.
 English Colonies in America, 3701a.

English Language, 1236b.
 English Measurements, 2315b.
 English Sculpture, 3235a.
 English Skylark, 2060b.
 English Universities, 3720b.
 Engraving, 1237a.
 Enid, Okla., 1238a.
 Enoch Arden, 3543b.
 Ensign, 1238a.
 Ensilage, 3307b.
 Entablature, 895b, 1238a.
 Entertaining, Suggestions for, 1238b.
 Entomology, Bureau of, 51a.
 Entry, Port of, 2911a.
 Envelope, 1244b.
 Environment, 1244b, 1262a.
 Envoy Extraordinary, 1244b.
 Eocene Epoch, 1245a.
 Epaminondas, 1245a.
 Ephesians, Epistle to the, 1245b.
 Ephesus, 1245b.
 Ephraim, 1245b.
 Epic, 1245b.
 Epictetus, 1245b.
 Epicureanism, 1246a.
 Epicurus, 1246a.
 Epidemic, 1246a.
 Epidermis, 3319a.
 Epiglottis, 541b, 2061a.
 Epigram, 1246b.
 Epimetheus, 2725b.
 Epilepsy, 1247a.
 Epiphany, 1247a.
 Epirus, 1247b.
 Epiphytes, 55a.
 Episcopal Church, 1247b.
 Epistle to Titus, 3587a.
 Epitaph, 1247b.
 Epithalamium, 3382b.
 E Pluribus Unum, 1248a.
 Epoch, 1248a.
 Epsom Salts, 1248a.
 Epworth League, 1248b.
 Equator, 1248b.
 Equatorial Current, 2630a.
 Equilibrium, 2091a.
 Equinoctial, 1248b.
 Equinoctial Line, 1035a.
 Equinox, 1249a.
 Equisetum, 1722b.
 Equity, 1249a, 2066b.
 Era of Good Feeling, 1249a, 3708a.
 Erasmus, Desiderius, 1249a.
 Erato, 2438b.
 Erebus, 1249b.
 Erebus and Terror, 3119b.
 Erechtheum, 1249b.
 Erfurt, Germany, 1249b.
 Ergot, 1250a.
 Ericson, Lief, 3774b.
 Ericsson, John, 1250a, 1823a.
 Eric the Red, 1250a.
 Erie, Battle of Lake, 1250b.
 Erie, Lake, 1250b.
 Erie, Pa., 1250b.
 Erie Canal, 1251a.
 Eris, 1251b, 2457b.
 Ermine, 1252a.
 Erosion, 1252a.
 Erratics, 1252b.
 Error, Writ of, 3949b.
 Errors, Correction of, 2045b.
 Erysipelas, 1253a.
 Erzerum, 1253a.
 Esau, 408a, 1253a.
 Escanaba, Mich., 1253a.
 Eschenbach, Wolfram, 2751a.
 Escorial, 1253b.
 Escrow, 1253b.
 Esdras, Books of, 1253b.
 Eskimo, 1254a, 2994b.
 Eskimo Dog, 1089b, 1254b.
 Esophagus, 541b.
 Esparto, 1255a.
 Esperanto, 1255a.
 Esquimaux, B. C., 1255b.
 Esquire, 24a.

Essay, 1255b.
 Essays of Elia, 2009b.
 Essays on Corn, 954a.
 Essed Pasha, 69a.
 Essen, Germany, 1256a.
 Estate, 1256a.
 Esther, Queen, 424a, 1256b.
 Esthetics, 1256b.
 Esthonia, 1256b.
 Estuary, 1257a, 3080a.
 Estufa, 855a.
 Etching, 1257a.
 Etesian Winds, 1257b.
 Ethelwulf, 85a, 1257b.
 Ether, 1257b.
 Ether (in medicine), 1257b.
 Ethical Training, 1263a.
 Ethics, 1258a.
 Ethiopia, 1264b.
 Ethiopian, 2994b.
 Ethnography, 1265a.
 Ethnology, 1265a.
 Ethyl Alcohol, 76a.
 Etiolation, 1265a.
 Etna, 1265a.
 Eton College, 1265b.
 Etruria, 1265b.
 Etruscan Vases, 1266a.
 Etymology, 1266a, 1546a.
 Euboea, 30a.
 Eucalyptus, 1266a.
 Eucharist, 1266b.
 Euchre, 1266b.
 Euclid, 1267a.
 Euclid, 47th Problem in, 2976a.
 Eugene, Ore., 1267a.
 Eugenics, 1267a.
 Eugenia-Marie de Montijo, 1267b.
 Euphorbiaceae, 3394a.
 Euphrates, 1268a.
 Euphrosyne, 1543b.
 Eurasians, 1268a.
 Eureka, Calif., 1268a.
 Eureka Springs, Ark., 1268b.
 Euripides, 1268b.
 Europa, 1268b.
 Europa, Story of, 2450a.
 Europe, 1269a.
 Europe, Races of, 2994b.
 Eurus, 31a.
 Eurydice, 1278a.
 Eustachian Tubes, 1278a.
 Eustachio, Bartolommeo, 1278a.
 Eutaw Springs, Battle of, 1278a.
 Euterpe, 1278b, 2438b.
 Evangelical Alliance, 1278b.
 Evangelical Association, 1278b.
 Evangeline, 469a, 1279a, 1548b.
 Evans, Robley Dunglison, 1279a.
 Evanston, Ill., 1279a.
 Evansville, Ind., 1279b.
 Evaporation, 1279b, 2837b.
 Evarts, William Maxwell, 1280a.
 Evening Schools, 1280a.
 Evening Star, 1280b.
 Everest, Mount, 1280b.
 Everett, Edward, 1280b.
 Everett, Wash., 1280b.
 Everglades, 1281a.
 Evergreen, 1281a.
 Evergreen State, 3808a.
 Everlasting Flower, 107b, 1281a.
 Evolution, 1281b, 3382a.
 Exaltation, 146a.
 Excalibur, 1281b.
 Ex Cathedra, 2902b.
 Excavations in Ancient Lands, 1282a.
 Excellency, 24a.
 Exchange, 1282b.
 Exchange, Bill of, 432a.
 Exchequer, Chancellor of the, 1282b.
 Exchequer Court of Canada, 1282b.

Excise Tax, 1283a.
 Excluded Middle, Law of, 3570b.
 Executive Council (Canada), 1283a.
 Executive Department, 1283b, 3693b.
 Executive Mansion, 3865a.
 Executor, 1283b.
 Exercise, 2830a, 2842b.
 Exergue, 2621b.
 Exeter, 1283b.
 Exile, 1284a.
 Exodus, 1284a.
 Exogenous Plants, 1284a.
 Exorcism, 1284a.
 Exotic, 1284a.
 Expansion, 1284b.
 Expansion, Territorial, of the United States, 3699b.
 Expectation, 1284b.
 Experiment Farms and Stations, Canadian, 52a.
 Expiration, 549b.
 Explorations, 2603b, 3366b.
 Explosives, 1284b.
 Exposition, Industrial, 1285a.
 Ex Post Facto Law, 1285b.
 Express Company, 1285b.
 Express Money Orders, 2387a.
 Express Train (game), 1439a.
 Extension, 1286a.
 Extraterritoriality, 1286a.
 Extract of Beef, 377a.
 Extractives, 1096b.
 Extracts, 1286b.
 Extradition, 1286b.
 Extrados, 158a.
 Extrajudicial Oath, 2627b.
 Extreme Unction, 3666b.
 Eyck (family), 1286b.
 Eye, 1287a.
 Ezekiel, 1289b.
 Ezra, 1289b.

F

F, 1290a.
 Fabius, 1290a.
 Fable, 1290a, 2022a, 2029a.
 Fabricord, 2073a.
 Facade, 1290b.
 Face, The, 1290b.
 Faces, False, 1291a.
 Factor, 1291a.
 Factory Legislation, 1291b.
 Faerie Queene, 3383a.
 Fafnir, 3302a.
 Fahrenheit, Gabriel Daniel, 1292b.
 Fahrenheit Scale, 3563b.
 Faience, 1292b.
 Fainting, 1292b.
 Fair, 1292b.
 Fairbanks, Alaska, 1293a.
 Fairbanks, Charles Warren, 1293a.
 Fairfax, Thomas, 1293a.
 Fair God, The, 3798a.
 Fairies, 1293b.
 Fairmont, W. Va., 1294a.
 Fair Oaks, Battle of, 1294a.
 Fairweather, Mount, 1294b.
 Faith Cure, 1294b.
 Fakirs, 1294b.
 Falcon, 1294b.
 Falconio, Diomedes, 1295a.
 Falkland Islands, 1295b.
 Fallen Timbers, Battle of, 2643a.
 Fallières, Clément Armand, 1295b.
 Falling Bodies, 1295b, 2836a.
 Falling Sickness, 1247a.
 Fall River, Mass., 1296a.
 False Grape, 3782b.
 False Imprisonment, 1296b.
 False Pretenses, 1296b.

Fame, Temple of, 3796b.
 Family (biology), 1296b.
 Famine, 1297a.
 Fandango, 1297a.
 Faneuil Hall, 1297a.
 Fantails, 2851b.
 Faraday, Michael, 1297b.
 Faradism, 1209a.
 Farallone Islands, 1298a.
 Farce, 1298a.
 Farcy, 1518b.
 Far Eastern Question, 1298a.
 Fargo, N. D., 1298b.
 Faribault, Minn., 1298b.
 Farley, John Murphy, 1298b.
 Farm Credits, 3134b.
 Farmers' Institute, 1299a.
 Farm Loan Associations, National, 3135a.
 Farm Loan Board, Federal, 3134b.
 Farm Sewerage, 3264b.
 Farms in Canada, 50a.
 Farne Islands, 1299a.
 Farnese (family), 1299b.
 Farnese Bull, 1299b.
 Farnese Hercules 1299b, 3233b.
 Farnese Palace, 1299b.
 Faroe Islands, 1299b.
 Farragut, David Glasgow, 1300a.
 Farrar, Frederick William, 1300b.
 Farrar, Geraldine, 1300b.
 Farthing, 1300b.
 Fasces, 1300b, 2098b.
 Fashion, 1300b.
 Fasts and Fasting, 1301a.
 Fat, 1301a.
 Fatalism, 1301b.
 Fata Morgana, 1301b.
 Fat-Back, 2298a.
 Fates, 1301b.
 Father, 1302a.
 Father-lasher, 1302a.
 Father of Angling, 1302a.
 Father of Comedy, 1302a.
 Father of English History, 1302a.
 Father of English Poetry, 760a.
 Father of English Prose, 2121a.
 Father of Epic Poetry, 1302a.
 Father of Greek Tragedy, 1302a.
 Father of His Country, 1302a, 3817a.
 Father of History, 1302a, 1678b.
 Father of Lies, 1302a.
 Father of Medicine, 1302a.
 Father of Modern Philosophy, 1062b.
 Father of the Faithful, 1302a.
 Father of Water, 1302a.
 Father Tiber, 3577b.
 Fathom, 1302a, 3843b.
 Fatigue, 1302a, 2843b.
 Fatima, 477a.
 Fats, 1367a.
 Fatty Degeneration, 1302b.
 Fault, 1302b.
 Faun, 1303a.
 Fauna, 1303a.
 Faure, François Félix, 1303a.
 Faust, Johann, 1303a.
 Fawkes, Guy, 1596b.
 Feasts, 1312a.
 Feathers, 1303b.
 February, 1304a.
 Federal Farm Loan Board, 3134b.
 Federal Hall, 1304b.
 Federalist, The, 1304b.
 Federal Land Banks, 3135a.
 Federal Party, 1305a, 2886b, 3706b.
 Federal Reserve Banks, 334b.
 Federal Reserve Board, 335a.
 Federal Reserve Notes, 2386a.

- Federal Trade Commission, 1305a.
 Federated Malay States, 1305a.
 Feeble-minded, Education of, 1305b.
 Feeling, 2959a.
 Fee Simple, 1256a, 1306a, 1307b.
 Fee Tail, 1256a.
 Feldspar, 1307b.
 Fellah, 1187b, 1307b.
 Fellowship, 1308a.
 Felony, 1308a.
 Felt, 1308a.
 Femur, 1308a, 3318b.
 Fencing, 1308a.
 Fénélon, François de Salignac, 1308b.
 Fenians, 1308b.
 Fennel, 1309a.
 Fer-de-lance, 1309a.
 Ferdinand, Archhduke Franz, 1400a, 3915a.
 Ferdinand I (Bulgaria), 1309a.
 Ferdinand I (Holy Roman Emperor), 1309b.
 Ferdinand II (Holy Roman Emperor), 1309b.
 Ferdinand II (Two Sicilies), 1309b.
 Ferdinand IV (Two Sicilies), 1309b.
 Ferdinand V (Aragon), 1310a, 3373b.
 Fermentation, 1310a.
 Fermented Liquors, 1310b.
 Fern, 1310b.
 Fern Islands, 1299a.
 Ferrara, Italy, 1311a.
 Ferrero, Guglielmo, 1311a.
 Ferret, 1311a.
 Ferris Wheel, 1311b.
 Ferrous Sulphate, 3467b.
 Fertilization, Cross, 994a.
 Fertilization of Plants, 994a, 2894b.
 Fertilizers, 1311b.
 Fessenden, Mrs. Clementina, 1222a.
 Festivals, 1312a.
 Fetish, 1312b.
 Feud, 3748a.
 Feudal System, 1312b.
 Fever, 1314a, 2229a.
 Feverfew, 1314b.
 Fez, 1314b.
 Fez, Morocco, 1314b.
 Fezzan, 1314b.
 Fiat Money, 1315a.
 Fiber, 1315a.
 Fibrin, 1315a.
 Fibula, 3318b.
 Fichte, Johann Gottlieb, 1315b.
 Fiction, 1315b.
 Fiddler Crab, 1317a.
 Fief, 1314a.
 Field, Cyrus West, 1317a.
 Field, Eugene, 1317b.
 Field, Marshall, 1318a.
 Field, Stephen Johnson, 1318a.
 Field Artillery, 226b.
 Field Columbian Museum, 1318b.
 Field Glass, 1318b.
 Fielding, Henry, 1318b.
 Field Magnet, 1160a.
 Field Marshal, 1319a.
 Field of the Cloth of Gold, 1319a.
 Fiery Cross, 1319a.
 Fife, 1319a.
 Fifteen Decisive Battles, 1319a.
 Fifty-four Forty or Fight, 2894a.
 Fig, 1320a.
 Figaro, 1320b.
 Fighting Temeraire, The, 3654a.
 Figures, Learning to use, 2620a.
 Figures of Speech, 1320b, 2462b.
 Figurines, 1857b.
 Fiji Islands, 1321a.
 Filament, 1354a.
 File, 1321b.
 Filefish, 1321b.
 Filibusters, 1321b.
 Filipepi, Alessandro, 529b.
 Filipino, 2817b.
 Fillmore, Millard, 1322a.
 Filter, 1324a.
 Finch, 1324b.
 Findlay, Ohio, 1324b.
 Fine, 1325a.
 Fine Arts, 1325a.
 Fingal's Cave, 1325a.
 Finger Print Identification, 1325a.
 Finland, 1325b.
 Finland, Gulf of, 1326a.
 Finley, John H., 1326b.
 Finnan Haddie, 1607a.
 Finns, 1326b.
 Fins, 1326b.
 Finsen, Niels Ryberg, 1327a.
 Fiord, 1327a.
 Fir, 1327a.
 Fire, 1327b.
 Fire Alarm, 1327b.
 Firebird, 328a.
 Fire Clay, 1328a.
 Firecrackers, 1328a.
 Fire Damp, 1328b, 2311b, 3153b.
 Fire Department, 1328b.
 Fire Engine, 1328b.
 Fire Escape, 1329a.
 Fire Extinguisher, 1329a.
 Firefly, 1329b.
 Fire Insurance, 1814a.
 Fireless Cooker, 1329b.
 Fire on the Mountains (game), 1441a.
 Fire Opal, 2663a.
 Fireproofing, 1329b.
 Fireworks, 1330a.
 Fire Worship, 1330a.
 First Aid to the Injured, 1330a.
 First In, First Out, (game), 1440b.
 First Lord of the Admiralty, 27a.
 First Triumvirate, 2898a.
 Fish, 1330b, 1467a, 2489a, 2490a, 3682a, 3826a.
 Fish Commission, United States, 1333b.
 Fish Crow, 995b.
 Fish Culture, 1333b.
 Fisher, Harrison, 1333b.
 Fisher, Irving, 1334a.
 Fisheries in Canada, 665a.
 Fish Hawk, 1334a.
 Fishing, 1334b.
 Fishing Eagle, 1334a.
 Fishing-frog, 125a.
 Fishing Laws, 1437b.
 Fiske, John, 1336a.
 Fiske, Minnie Maddern, 1336a.
 Fisk University, 1336b.
 Fitch, John 1336b, 3282b.
 Fitch, (William) Clyde, 1336b.
 Fitchburg, Mass., 1337a.
 Fitz, 2467b.
 Fitzgerald, Edward, 1337a.
 Fiume, 1337a.
 Five Civilized Tribes, 1337b.
 Five Classics, 802a.
 Five Forks, Battle of, 1337b.
 Five Nations, The, 1338a.
 Fixed Stars, 1338a.
 Fjord, 1327a.
 Flag, 1338b.
 Flag, Development of the, 3695b.
 Flag, United States, 1339b, 3119b.
 Flageolet, 1341b.
 Flagg, James Montgomery, 1341b.
 Flag Officer, 1341b.
 Flag of the Governor-General, 1342b.
 Flag of the Phrophet, 1341b.
 Flags of the British Empire, 1341b.
 Flamboyant, 1343a.
 Flame, 1343a.
 Flamingo, 1343a.
 Flaminian Way, 1343b, 3096b.
 Flammarion, Camille, 1344a.
 Flanders, 1344a.
 Flanders, Battle of, 3918a.
 Flannel, 1344a.
 Flatfish, 1344b.
 Flathead, 1344b.
 Flax, 1344b.
 Flea, 1345a.
 Fleabane, 1345b.
 Flemings, 382b.
 Flemish Language, 1345b.
 Fletcher, Frank Friday, 1345b.
 Fletcher, John, 370b.
 Fletcherizing, 1345b.
 Fleur-de-lis, 1346a, 1836a.
 Flexibility, 1346a.
 Flexner, Simon, 1346a.
 Flicker, 1346a, 3962a.
 Floating Mines, 3457a.
 Flint, 1346b.
 Flint, Mich., 1346b.
 Flint Glass, 1522a.
 Flintlock, 1346b.
 Flodden Field, Battle of, 3224b.
 Flood, 1346b.
 Flood Plain, 1347b.
 Flora, 1303a, 1347b.
 Florence, Ala., 1348a.
 Florence, Italy, 1348a.
 Florentine School of Painting, 1348b.
 Floriculture, 1348b.
 Florida, 1349a.
 Florida Keys, 1353a.
 Florin, 1353a.
 Flotow, Friedrich von, 1353a.
 Flounder, 1353a.
 Flour, 1353b.
 Flowering Moss, 2976b.
 Flowers, 1354a.
 Flowers, Hidden Names, 1239.
 Floyd, John Buchanan, 1358b.
 Fluid, 1358b.
 Fluorescence, 1359a.
 Fluorides, 1359b.
 Fluorine, 1359b.
 Fluorite, 1359b.
 Fluor Spar, 1359b.
 Flute, 1359b.
 Fly, 1360a, 1809b, 1810a.
 Flycatcher, 1361a.
 Flying Buttress, 619a.
 Flying Cat, 1365b.
 Flying Dutchman, The, 1361a, 3794b.
 Flying Fish, 1361a.
 Flying Lizard, 1110b.
 Flying Machine, 1361b, 1823a.
 Flying Marmot, 1365b.
 Flying Squirrel, 1365a.
 Flywheel, 1365b.
 Foch, Ferdinand, 1365b, 3934b.
 Foehn, 807b.
 Fog, 1366a, 1468b.
 Folkething, 1057b.
 Folklore, 1366a.
 Follow the Leader (game), 1439b.
 Fomentation, 1366a.
 Fond du Lac, Wis., 1366a.
 Fontainebleau, France, 1366b.
 Food, 1366b.
 Food, Wise Selection of, 2834a.
 Foodstuffs, 1095a.
 Fools, Feast of, 1367b.
 Foot (measure), 1368a.
 Foot, The, 1368a.
 Foot and Mouth Disease, 1368b.
 Football, 1368b.
 Football, Association, 254b.

Foote, Andrew Hull, 1371b.
 Foote, Arthur, 1372a.
 Foote, Mary Hallock, 1372a.
 Foot Pound, 1372a, 3670b.
 Foot Rot, 1372a.
 Foraminifera, 1372a.
 Forbes-Robertson, Johnston, 1372b.
 Forbidden City, The, 2769a.
 Force, 1372b.
 Force Bills, 1373a.
 Forceps, 1373a.
 Force Pump, 2969b.
 Forcing House, 1580b.
 Ford, Henry, 1373a.
 Ford, Paul Leicester, 1373b.
 Foreclosure, 876a, 2418b.
 Foreign Commerce, 3688b.
 Foreign Phrases, 1373b.
 Foreordination, 1374b.
 Foreshortening, 1375a.
 Foresters, Ancient Order of, 1375a.
 Foresters, Independent Order of, 1375a.
 Foresters of America, 1375a.
 Forest Reserves, 1379a.
 Forest Reserves in Canada, 1379a.
 Forestry Branch, 1379b.
 Forests and Forestry, 1375b.
 Forests of Canada, 664a.
 Forest Service, 1377b.
 Forgery, 1380a.
 Forget, Amadee Emmanuel, 1380a.
 Forget-me-not, 1380a.
 Formaldehyde, 1380b.
 Formation, 372b.
 Formic Acid, 1380b.
 Formicarium, 132b.
 Formosa, 1380b.
 Forrest, Edwin, 1380b.
 Fort Collins, Colo., 1381a.
 Fort Dearborn, 1381a.
 Fort de France, 3621b.
 Fort Dodge, Iowa, 1381a.
 Fort Duquesne, 1381b.
 Fort, 2442a.
 Forth, 1381b.
 Forth Bridge, 1381b.
 Fort Henry and Fort Donelson, 1381b.
 Fort Howe Park, 2743a.
 Fortification, 1382a.
 Fortissimo, 2442a.
 Fort Madison, Ia., 1382b.
 Fort Mims, Massacre of, 1383a.
 Fort Moultrie, 1383a.
 Fort Niagara, 1383a.
 Fort Pitt, 2862h.
 Fortress Monroe, 1383a.
 Fort Scott, Kans., 1383b.
 Fort Smith, Ark., 1383b.
 Fort Sumter, 1383b.
 Fortuna, 1384a.
 Fort Wayne, Ind., 1384a.
 Fort William, Ont., 1384b.
 Fort Worth, Tex., 1384b, 3552b.
 Forty-two Articles, 3041b.
 Forum Romanorum, 1385a, 3096a.
 Fossil, 1385a, 1479a.
 Fossil-flax, 239b.
 Fossil Ore, 1837a.
 Fossil-paper, 239b.
 Foster, George Eulas, 1385b.
 Foster, Stephen Collins, 1385b.
 Fostoria, Ohio, 1386a.
 Foucault, Jean Bernard Leon, 1386a.
 Founding, 1386a.
 Fountain, 1386b.
 Fountain of Youth, 1386b.
 Four Books, 802a.
 Four O'clock, 1387a.
 Fourth of July, 1778b.
 Fowl, 1387a.
 Fox, 1387a.
 Fox, Charles James, 1388a.

Fox, George, 1388a, 2978a.
 Fox, John, Jr., 1388a.
 Fox and the Crow, The, 2022b.
 Foxglove, 1388a.
 Foxhound, 1388b.
 Fox Indians, 1387b.
 Foxtail Grass, 1388b.
 Fox Terrier, 1388b.
 Fox Trot, 1025b.
 Fraction, 1389a.
 Fraction Chart, 185b.
 Fra Diavolo, 1389a.
 Fram, The, 116b, 2468b, 3366b.
 Franc, 1389a.
 France, 1389b.
 Francesca da Rimini, 131a.
 Franchise, 1399a.
 Francis I (Holy Roman Emperor), 1399b.
 Francis II (Holy Roman Emperor), 1399b.
 Franciscans, 1399b.
 Francis Joseph, 299b, 1399b.
 Francis of Assisi, Saint, 1400b.
 Franck, Cesar Auguste Jean Guillaume, 1400b.
 Franco-German War, 1400b, 3374a.
 Francois of Lorraine, 1593a.
 Francolin, 1401b.
 Franconia Mountains, 3866a.
 Frankfort, Ind., 1401b.
 Frankfort, Ky., 1401b.
 Frankfort - on - the - Main, Germany, 1402a.
 Franking, 1402b.
 Frankland, 1402b.
 Franklin (Canada), 1402b.
 Franklin, Battle of, 1402b.
 Franklin, Benjamin, 1403a.
 Franklin, John, 1404a, 2605b.
 Franklin, Pa., 1404a.
 Franks, The, 1404a.
 Franz-Joseph Land, 1404b.
 Frazer River, 1404b.
 Fraternal Societies, 1404b.
 Fraternities, College, 1405a.
 Fraud, 1405b.
 Frau Holle, 3433a.
 Fraunhofer, Joseph von, 1405b, 3380a.
 Fraxitanic Acid, 3512a.
 Frechette, Louis Honore, 1406a.
 Freckles, 1406a.
 Frederick, Md., 1406a.
 Frederick I (Prussia), 1406b.
 Frederick II (Prussia), 1406b.
 Frederick III (Prussia), 1407a.
 Frederick I, Barbarossa, 997b, 1407a.
 Frederick II (Sicily), 1407a.
 Frederick VIII, 1407b.
 Fredericksburg, Battle of, 1407b.
 Frederick the Great, 1406b, 2957a, 3819a.
 Frederick William, 1407b.
 Frederick William I, 1408a, 2956b.
 Frederick William III, 1408a.
 Frederick William IV, 1408a.
 Frederick William, Crown Prince, 3946a.
 Fredericton, N. B., 1408a.
 Frederiksted, Virgin Islands, 3620b.
 Free Cities, 1408b.
 Freedmen's Bureau, 1408b.
 Free-Hand Drawing, 1117b.
 Freeholds, 1256a.
 Freeman, Mary E. Wilkins, 1408b.
 Free Masonry, 2268b.
 Free Methodist Church, 1409a, 2312a.
 Freeport, Ill., 1409a.
 Free-soil Party, 1409a, 2887b.
 Freethinkers, 1409b.
 Freetown, 1409b.

Free Trade, 1409b, 3515a.
 Free Will, 1410a.
 Freezing, 1410a, 2294b.
 Freezing Point, 3563b.
 Fremont, John Charles, 1410b.
 Fremont, Nebr., 1410b.
 Fremont, Ohio, 1411a.
 Fremsted, Olive, 1411a.
 French, Alice, 1411a.
 French, Daniel Chester, 1411b, 3236a.
 French, John, 1411b, 3917b.
 French Academy, 11a.
 French and Indian Wars, 1412a.
 French Canadians, 2980b.
 French Chalk, 3505a.
 French Colonies, 884a.
 French Congo, 1413a.
 French Equatorial Africa, 913a, 1413a.
 French Guiana, 1413b.
 French Indo-China, 1414a.
 French Language, 1414a.
 French Literature, 2122b.
 French Revolution, 359b, 1414b.
 French Sculpture, 3234b.
 French Somaliland, 3344b.
 Frenchtown, Battle of, 3005a.
 French Universities, 3720b.
 French West Africa, 1417a.
 Fresco Painting, 1417a.
 Fresh-Water Polyp, 1744a.
 Fresno, Calif., 1417b.
 Frey, 1417b.
 Freya, 1417b.
 Friar, 2382b.
 Friction, 1418a.
 Friday, 1418a.
 Friendly Islands, 3593b.
 Friendly Societies, 1404b.
 Frieze, 1238a.
 Frigate, 1418b.
 Frigate Bird, 1418b.
 Frigga, 1419a.
 Frobisher, Martin, 1419a.
 Froebel, Friedrich Wilhelm August, 1419a.
 Frog, 1419b.
 Frog and the Ox, The, 3432b.
 Frog Fish, 125a.
 Frog in the Middle (game), 1440b.
 Frohman (family), 1420a.
 Froissart, Jean, 1420a.
 Fronde, 1420b.
 Frontenac, Louis de Baude, 1420b.
 Frost, 1420b.
 Frost, Sarah Frances, 2255a.
 Frostbite, 1421a.
 Froude, James Anthony, 1421a.
 Frou-Frou, 1613b.
 Fruits, 1421b, 3684b.
 Frying (cooking), 1100a.
 Fu-chow, China, 1421b.
 Fuchsia, 1422a.
 Fuel, 1422a.
 Fugitive Slave Laws, 1422b.
 Fijiyama, 1422b, 3614b.
 Fulgurite, 1422b.
 Fuller, Margaret, 2687a.
 Fuller, Melville Weston, 1423a.
 Fuller's Earth, 1423a.
 Fulmar, 1423a.
 Fulmination, 1423b.
 Fulton, N.Y., 1423b.
 Fulton, Robert, 1423b, 1823a.
 Fumeroles, 3965a.
 Fumigation, 1424a.
 Fundamental Orders of Connecticut, 3701b.
 Fundy, Bay of, 1424a.
 Funeral March, 811a.
 Fungi, 1080a, 1424a.
 Fungicides, 1806a.
 Funston, Frederick, 1424b.
 Fur and Fur Trade, 1425a, 3682a.
 Fur Farming, 1426a, 2940a.

Furies, 1426b.
 Furlong, 1426b, 3844a.
 Furnace, 1426b.
 Furness, Horace Howard, 1427a.
 Furniture, 1427a.
 Fur Seal, 3240b.
 Fuse, 1427b.
 Fusel Oil, 1428a.
 Fusing Point, 1428a.
 Fusion, 1428b.
 Fust, Johann, 1303b.

G

G, 1429a.
 Gabers, 1507a.
 Gable, 1429a.
 Gabriel, 1429a.
 Gadfly, 1429a.
 Gadsden, Ala., 1429b.
 Gadsden Purchase, 1429b.
 Gadshill, 1073a.
 Gadski, Johanna, 1429b.
 Gadwall, 1150a, 1430a.
 Gael, 1430a.
 Gaelic, 3222b.
 Gage, 1455a.
 Gage, Thomas, 1430a.
 Gainsborough, Thomas, 1430b.
 Galahad, Sir, 1430b, 3547a.
 Galapagos Islands, 1430b.
 Galatia, 1430b.
 Galaxy, 2340a.
 Galba, Servius Sulpicius, 1431a.
 Galen, 1431a.
 Galena, 1431a.
 Galena, Ill., 1431a.
 Galesburg, Ill., 1431b.
 Galicia, 1431b.
 Galilee, 1432a.
 Galilee, Sea of, 1432b.
 Galileo, 1432b, 1823a.
 Gall, Franz Joseph, 1433a.
 Gallatin, Albert, 1433a.
 Gall Bladder, 1433b.
 Galley, 1433b.
 Galli-Curci, Amelita, 1434a.
 Gallinule, 1434a.
 Gallipoli, 1434a.
 Gallium, 1434b.
 Gallon, 1434b.
 Galloways, 729a.
 Galls, 1434b.
 Galop, 1025a.
 Galsworthy, John, 1434b.
 Galt, Alexander Tilloch, 1435a.
 Galt, Ont., 1435a.
 Galton, Francis, 1435b.
 Galvani, Luigi, 1435b.
 Galvanic Battery, 1196a.
 Galvanism, 1209a, 1435b.
 Galvanized Iron, 1435b.
 Galvanometer, 1436a.
 Galveston, Tex., 1436a, 3552b.
 Galveston Plan, 899b.
 Gama, Vasco Da, 1436b.
 Gama Grass, 1436b.
 Gamaliel, 1437a.
 Gambetta, Leon, 1437a.
 Gambling, 1437a.
 Game, 1437b.
 Game Laws, 1437b.
 Game Preserves, 1438a.
 Game Reservations, 1438a.
 Games, 1438b.
 Games for Primary Teachers, 1979a.
 Ganges Canals, 1442b.
 Ganges River, 1442a.
 Ganglion, 1442b.
 Gangrene, 1442b.
 Gannet, 1442b.
 Ganymede, 1442b.
 Gapes, 1443a.
 Gar, 1443a.
 Garage, 1443a.
 Garbage, 1443a.

Garcia y Iniguez, Calixto, 1443b.
 Garda, Lake, 1444a.
 Garden, Mary, 1444a.
 Gardenia, 1444a.
 Gardening, 1444b.
 Garden of the Gods, 1445a.
 Gardiner, Samuel Rawson, 1445a.
 Garfield, Harry Augustus, 1445b, 3879a.
 Garfield, James Abram, 1445b.
 Garget, 2882b.
 Gargle, 1447b.
 Gargoyle, 1447b.
 Garibaldi, Guiseppe, 1447b.
 Garland, Hamlin, 1448a.
 Garlic, 1448a.
 Garnet, 461a, 1448b.
 Garnishment, 1448b.
 Garonne River, 1448b.
 Garrick, David, 1449a.
 Garrison, William Lloyd, 1449a.
 Garrotte, 1449a.
 Garter, Order of the, 2671a.
 Garter Snake, 1449b.
 Gary, Elbert Henry, 1449b.
 Gary, Ind., 1449b.
 Gary School Plan, 1450a.
 Gas, 1450a.
 Gas, Illuminating, 1451a.
 Gas, Natural, 1452b, 3678a.
 Gas, Poison, 2881a.
 Gascony, 1453a.
 Gas Engine, 1453a, 1823a.
 Gaskell, Elizabeth Cleghorn, 1453b.
 Gasoline, 1453b.
 Gasoline Motor, 304a.
 Gaspar, 2217b.
 Gas Tar, 865b.
 Gastric Juice, 1454a.
 Gastritis, 1454a.
 Gastropod, 1454b.
 Gates, Horatio, 1454b.
 Gath, 1454b.
 Gatineau River, 1454b.
 Gatling, Richard Jordan, 1454b, 1823a.
 Gatling Gun, 1823a.
 Gauge, 1455a.
 Gaul, 1394a, 1455a.
 Gauntlet, 1455b.
 Gauze, 1455b.
 Gavial, 1455b.
 Gavotte, 1456a.
 Gawa River, 1873b.
 Gay-Lussac, Louis Joseph, 1456a.
 Gaza, Syria, 1456a.
 Gazelle, 1456a.
 Gearing, 1456b.
 Gecko, 1456b.
 Gehenna, 1456b, 1666a.
 Geibel, Emanuel, 1457a.
 Geikie, Archibald, 1457a.
 Geissler Tubes, 993a, 1457a.
 Gelatin, 1457b.
 Gelatinoids, 1096b.
 Gelee, Claude, 1457b.
 Gelsemium, 1457b.
 Gemara, 3508a.
 Gemini, 1457b.
 Gem of the Mountains, 1758a.
 Gems, 2930b.
 Gems, Artificial, 1457b.
 Gendarmes, 1458a.
 Genealogy, 1458a.
 General (military), 1458b.
 General Education Board, 1458b.
 General Grant National Park, 2742a.
 General Officers, 228a.
 General Staff, 225b, 1458b.
 Genesis, 1458b.
 Genet, Edmon Charles Edouard, 1459a, 3820b.
 Geneva, Lake, 1459a.

Geneva, N.Y., 1459a.
 Geneva, Switzerland, 1459b, 2483b.
 Geneva Arbitration, 1459b.
 Geneva Convention, 1459b.
 Genghis Khan, 1460a.
 Genii, 1460a.
 Gennesaret, Lake of, 1432b.
 Genoa, Italy, 1460a.
 Genre Painting, 1460b, 2702a.
 Gentain, 1460b.
 Gentiles, 1461a.
 Genus, 1461a.
 Geographical Mile, 3843b.
 Geography, 1461a.
 Geography, Methods of Teaching, 1470b.
 Geological Survey of the United States, 1473b.
 Geology, 1474a.
 Geometry, 1481a, 2280b.
 George, David Lloyd, 1482a.
 George, Henry, 1484b, 3312a.
 George, Lake, 1483a.
 George, Saint, 1484b.
 George I (England), 1483a.
 George I (Greece), 1484b.
 George II (England), 1483a, 3262b.
 George III (England), 1483b.
 George IV (England), 1483b.
 George V (England), 1483b.
 George Eliot, 1213a.
 George Junior Republic, 1484a.
 George Peabody College for Teachers, 2760b.
 Georgetown, British Guiana, 1485a.
 George Washington University, The, 1485a.
 Georgia, 1485b.
 Georgia (Transcaucasia), 1488b.
 Georgia, Strait of, 1488b.
 Georgia, University of, 1488b.
 Georgian Bay, 1488b.
 Georgian Bay Ship Canal, 1491a.
 Georgics, 1074a, 3756b.
 Geranium, 1491a.
 Gerard, James Watson, 1491a.
 Germania, 3497a.
 German Colonies, 3919b.
 German East Africa, 1491b.
 German Language, 1491b.
 German Literature, 2123a.
 German Measles, 784a.
 German Sculpture, 3235a.
 German Silver, 1492a, 2570b.
 German Southwest Africa, 1492b.
 Germantown, Battle of, 1492b.
 Germany, 1493a, 3763a, 3937a.
 Germination, 1503a.
 Germs, 1504a.
 Germ Theory of Disease, 1504a.
 Gerome, Jean Leon, 1505a.
 Geronimo, 1505a.
 Gerry, Elbridge, 1505a.
 Gerrymander, 1505a.
 Gethsemane, 1505b.
 Gettysburg, Battle of, 1505b.
 Gettysburg Address, 1506a.
 Geyser, 1506b.
 Geysers of Yellowstone, 3964b.
 Ghauts Mountains, 1506b.
 Ghebers, 1507a.
 Ghent, Belgium, 1507a.
 Ghent, Treaty of, 1507b, 3806a.
 Ghetto, 1507b.
 Ghiberti, Lorenzo, 1507b.
 Ghost, 1508a.
 Giant, 1508a.
 Giant Cactus, 741a.
 Giants' Causeway, 1508b.
 Gibbon, 1509a.
 Gibbon, Edward, 1509a.
 Gibbons, James, 1509b.
 Gibraltar, 1510a.
 Gibraltar, Strait of, 1510b.

Gibraltar of America, 2985a.
 Gibraltar of the East, 24b.
 Gibraltar of the West Indies, 3621b.
 Gibson, Charles Dana, 1510b.
 Gideon, 1510b.
 Gideon's Band, 1510b.
 Gifts the Dwarfs Made, The, 3439b.
 Gila River, 1511a.
 Gila Monster, 1511a.
 Gilbert, Humphrey, 1511a.
 Gilbert, William Schwenk, 1511a.
 Gilding, 1511b.
 Gilead, 1511b.
 Gill, 1512a.
 Gillett, Frederick Huntington, 1512a.
 Gillette, William, 1512a.
 Gilman, Daniel Coit, 1512b.
 Gilmore, Patrick S., 331a.
 Gin, 1512b.
 Ginger, 1512b.
 Gingham, 1512b.
 Ginko, 1513a.
 Ginseng, 1513a.
 Giorgione, 1513a.
 Giotto, 1513b.
 Gipsy, 1603a.
 Giraffe, 1513b.
 Girard, Stephen, 1514a.
 Girard College, 1514a.
 Girasol, 1514b.
 Girl Scouts, 1514b.
 Girondists, 1514b.
 Given Meridian, 2165a.
 Gizzard, 1514b.
 Glace Bay, N. S., 1514b.
 Glacial Acetic Acid, 13a.
 Glacial Period, 1514b.
 Glacier, 1468a, 1516a.
 Glacier National Park, 1515b, 2743a.
 Gladiator, 1517a, 3377b.
 Gladiolus, 1517a.
 Gladstone, William Ewart, 1517b.
 Glance, 1518a.
 Gland, 1518b.
 Glanders, 1518b.
 Glasgow, Scotland, 1519a.
 Glasgow, University of, 1520a.
 Glass, 1520a, 3398a.
 Glass Snake, 1522b.
 Glauber's Salt, 1523a.
 Glazing, 2924b, 2925a.
 Gleaners, The, 2707b.
 Glenns Falls, N.Y., 1523a.
 Gliding Joint, 1906b.
 Globe, 1523a.
 Globe, Ariz., 1523a.
 Globe Amaranth, 107b.
 Glorification, 146a.
 Gloucester, Eng., 1523b.
 Gloucester, Mass., 1523b.
 Glove, 1523b.
 Gloversville, N.Y., 1524a.
 Glowworm, 1329b.
 Gloxinia, 1524a.
 Gluck, Alma, 1524a.
 Gluck, Christop Willibald, 1524b.
 Glucose, 29a, 1524b.
 Glue, 1525a.
 Gluten, 1525a.
 Glutton, 1525b.
 Glycerine, 1525b.
 Glycogen, 2143b.
 Glyn, Elinor, 1525b.
 Gnat, 1526a.
 Gneiss, 1526a.
 Gnomes, 1293b, 1526a.
 Gnu, 1526a.
 Goat, 1526b.
 Goat Island, 2565b.
 Goatsucker, 1527a.
 Gobelin Tapestry, 3513a.
 Gobi, Desert of, 1527a.
 God, 1527a.

Goddess of Liberty, 2555b.
 Goderich, Ont., 1527b.
 Godfrey de Bouillon, 1527b.
 Godiva, Lady, 1528a.
 God Save the King, 1528a.
 Godwin, Mary, 3276b.
 Goethals George Washing-
 ton, 1528b, 2722b.
 Goethe, Johann Wolfgang von, 1528b.
 Goiter, 1529b.
 Golconda, 1530a.
 Gold, 1530a, 2385a, 3678a, 3973a.
 Gold-beating, 1531a.
 Gold Certificates, 2386a.
 Gold Coast, 1531b.
 Golden Age, 1532a.
 Golden Bull, 1532a.
 Golden Fleece, 1532a.
 Golden Gate, 1532a.
 Golden Horn, 1532a.
 Golden Lily, 3827a.
 Golden Robin, 328a.
 Goldenrod, 1532b.
 Golden State, The, 640a.
 Golden-winged Woodpecker, 1346a, 3962a.
 Goldfinch, 1532b.
 Goldfish, 1532b.
 Gold Lace, 1533a.
 Goldsboro, N. C., 1533a.
 Goldschmidt, Madame Otto, 2115a.
 Goldsmith, Oliver, 1533a.
 Golf, 1533b.
 Goliath, 417b, 1535a.
 Gomez y Baez, Maximo, 1535a.
 Gompers, Samuel, 1535a.
 Gondola, 1535b.
 Gonsalvo de Cordova, Gonzalo
 Hernandex y Aguilar, 1535b.
 Goober, 2764a.
 Good Feeling, Era of, 3708a.
 Good Friday, 1536a.
 Good Health (theme), 3559b.
 Good Roads Movement, 3082a, 3688a.
 Good Templars, Independent
 Order of, 1536a.
 Good Will, 1536a.
 Goodwin, Nathaniel Carl, 1536a.
 Goodyear, Charles, 1536b, 1823a, 3127b.
 Goose, 1536b.
 Gooseberry, 1536b.
 Goose-fish, 125a.
 Goose Flesh, 2438a.
 Goosefoot, 1537a.
 Goose That Laid the Golden
 Egg, The, 2030a.
 Gopher, 1537a.
 Goramy, 1537a.
 Gordian Knot, 1537a.
 Gordon, Charles George, 1537b.
 Gordon, Charles William, 1537b.
 Gorgas, William Crawford, 1538a, 2723a.
 Gorges, Fernando, 2227a.
 Gorgons, 1538a, 2293a.
 Gorilla, 1538b.
 Gorky, Maxim, 1539a.
 Goshawk, 1539a.
 Goshen, 1539a.
 Goshen, Ind., 1539a.
 Gosnold, Bartholomew, 1539b.
 Gospels, 1539b.
 Gossamer, 1539b.
 Gotham, 1539b.
 Gothic Architecture, 156a.
 Gothenburg, Sweden, 1540a.
 Goths, 1540a.
 Gotterdammerung, 3795a.
 Gough, John Bartholomew, 1540b.
 Gould, George Jay, 1540b.
 Gould, Helen Miller, 3277a.
 Gould, Jay, 1540b.

Gounod, Charles Francois, 1541a.
 Gourami, 1537a.
 Gourd, 1541a.
 Gout, 1541b.
 Government, 1541b.
 Government, Organization of
 the National, 3706b.
 Government Annuities, 2652b.
 Government Bonds, 498a.
 Government of Canada, 667a.
 Government of the United
 States, 3692b.
 Governor (machinery), 1542b.
 Governor-General, 1542b.
 Governor's Island, 1543b.
 Gracchus, 1543b.
 Grace, Days of, 1543b.
 Graces, 1543b.
 Grackle, 1544a.
 Grady, Henry Woodfin, 1544a.
 Grafting, 1544a.
 Graham Land, 1545a.
 Grail, The Holy, 1545a.
 Grain Elevator, 1545b.
 Grains, 1545b.
 Gram, 1546a, 2315b.
 Grammar, 1546a, 2038b.
 Gramophone, 3506a.
 Grampian Hills, 1546a.
 Grampus, 1546b.
 Granada (kingdom), 1546b.
 Granada, Spain, 1546b.
 Grand Army of the Republic, 1547a.
 Grand Banks, 1333a, 1547a.
 Grand Canyon of the Colorado, 1547a.
 Grand Duchy, 1149a.
 Grandfather's Clause, 1548a.
 Grand Forks, N.D., 1548a.
 Grand Island, Neb., 1548a.
 Grand Jury, 1919b.
 Grand Mufti, 3275a.
 Grand Pre, N.S., 1548a.
 Grand Rapids, Mich., 1548b.
 Grand Remonstrance, 1548b.
 Grands Boulevards, 2737a.
 Grand Trunk Railway, 3002a.
 Grand Trunk Pacific Railway, 3003a.
 Granite, 594b, 1549a.
 Granite City, Illinois, 1549a.
 Granite State, The, 2529b.
 Grant, Frederick Dent, 1549b.
 Grant, George Monro, 1549b.
 Grant, Robert, 1549b.
 Grant, Ulysses Simpson, 838a, 839b, 1550a.
 Granular Conjunctivitis, 1553b.
 Granulation, 1553b.
 Grape, 1553b.
 Grapefruit, 1554a.
 Graphite, 767b, 1554b.
 Graphophone, 3505a.
 Grasses, 1554b.
 Grasshopper, 1555a, 2152a.
 Gratz, 1555b.
 Gravitation, 1555b.
 Gravity, Center of, 738b.
 Gravity, Specific, 1556a.
 Gray, Asa, 1556b.
 Gray, Elisha, 1556b.
 Gray, George, 1557a.
 Gray, Thomas, 1557a.
 Gray Book, 477b.
 Grayling, 1557a.
 Gray's Harbor, Wash., 6b.
 Graz, Hungary, 1555b.
 Great American Desert, 3725b.
 Great Bear Lake, 1557b.
 Great Britain, 1557b.
 Great Charter, 2218b.
 Great Circle, 3383a.
 Great Dane, 1565a.
 Great Eastern, 627a, 1317b.
 Great Expectations, 1072b.
 Great Falls, Mont., 1565a.
 Great Lakes, 1565b.

Great Lakes Naval Training Station 4017

Great Lakes Naval Training Station, 2494a.
 Great Pedee River, 1566a.
 Great Pyramid, 2973b.
 Great Salt Lake, 1566a.
 Great Seal of the United States, 3692a.
 Great Slave Lake, 1566b.
 Great Stone Face, The, 2530a, 3866b.
 Great Wall of China, 1566b.
 Great White Way, 2556a.
 Great Yarmouth, Eng., 3960b.
 Grebe, 1566b.
 Grecian Mythology, 2448b.
 Greece, 1567a.
 Greece, in World War, 3920a.
 Greek Architecture, 164a.
 Greek Church, 1577b.
 Greek Cross, 994a.
 Greek Fire, 1578a.
 Greek Language, 1578a.
 Greek Literature, 2122a.
 Greek Sculpture, 323 b.
 Greeley, Colo., 1578b.
 Greeley, Horace, 1578b.
 Greeley, Adolphus Washington, 1579a.
 Green (color), 1579a.
 Green, Anna Katharine, 3092a.
 Green, Hetty, 1579b.
 Green, John Richard, 1579b.
 Greenaway, Kate, 1579b.
 Greenback Party, 1579b, 2890b.
 Greenbacks, 1580a.
 Green Bay, Wis., 1580a.
 Green Book, 477b.
 Green Brier, 1580a.
 Greene, Nathaniel, 1580b.
 Greenhouse, 1580b.
 Greenland, 1580b.
 Green Mountain Boys, 1581a, 3579a.
 Green Mountains, 1581a.
 Green Mountain State, 3757a.
 Green Racer, 466b.
 Green River, 1581a.
 Greensboro, N.C., 1581a.
 Greensburg, Pa., 1581b.
 Greenville, Miss, 1581b.
 Greenville, S. C., 1581b.
 Greenville, Tex., 1581b.
 Green Vitriol, 3467b.
 Greenwich, Eng., 1582a.
 Greenwich Observatory, 1582a.
 Gregorian Calendar, 637b, 1582a.
 Gregory (Popes), 1582a.
 Grenada, 1583a.
 Grenade, 1583a.
 Grenadier, 1583a.
 Grenfell, Wilfred Thomasen, 1583a.
 Gresham's Law, 1583b.
 Gretna Green, 1583b.
 Grevy, Jules, 1583b.
 Grey, Albert Henry George, 1584a.
 Grey, Charles, 1584a.
 Grey, Edward, 1584b.
 Grey, Lady Jane, 1584b.
 Greyhound, 1089b, 1585a.
 Greylock Mountain, 22a.
 Grieg, Edvard Hagerup, 1585a.
 Grimm, Jakob Ludwig, 1585a.
 Grimm, Wilhelm Karl, 1585a.
 Grimm's Fairy Tales, 1585b.
 Grindstone, 1585b.
 Grippe, 785a, 1586a, 1801a.
 Griqualand (East and West), 1586a.
 Gris-nez Cape, 1586a.
 Gromwell, 1586a.
 Grosbeak, 1586a.
 Grotius, Hugo, 1586b.
 Ground Cuckoo, 3081a.
 Ground Hog, 3908a.
 Ground Ivy, 1586b, 1858b.
 Ground Squirrel, 1586b.
 Grouse, 1586b.
 Grub, 1587a.
 Grunters, 1596b.
 G. S. System, 3670b.
 Guadalajara, Mex., 1587a.
 Guadalquivir River, 1587b.
 Guadalupe Hidalgo, Treaty of, 1587b, 2318b.
 Guadeloupe Islands, 1587b.
 Guadiana River, 1588a.
 Guam, 1588a.
 Guan, 1588b.
 Guanaco, 1588b.
 Guanajuato, Mex., 1588b.
 Guano, 1588b.
 Guarani, 3723b.
 Guarantee, 1589a.
 Guardian, 1589a.
 Guasa, 1894a.
 Guatemala (city), 1589b.
 Guatemala (republic), 1589a.
 Guava, 1589b.
 Guayule Plant, 3127a.
 Guayaquil, Ecuador, 1590a.
 Gudgeon, 1590a.
 Guelder Rose, 1590b, 3332b.
 Guelph, Ont., 1590b.
 Guelphs and Ghibellines, 1590b.
 Guerin, Jules, 1590b.
 Guernsey (Island), 1591a.
 Guernsey Cattle, 729a.
 Guess Again (game), 1442a.
 Guessing Contests, 1240b, 1243b.
 Guevi, 137a.
 Guido Reni, 1591a.
 Guild, 1591a.
 Guild, 1591b.
 Guilford Court House, Battle of, 1591b.
 Guillemot, 1591b.
 Guillotine, 1592a.
 Guilt Offering, 3153a.
 Guinea (Africa), 1592a.
 Guinea (coin), 1592b.
 Guinea Fowl, 1592b.
 Guinea Pig, 1592b.
 Guiscard, Robert, 2470a.
 Guise, 1593a.
 Guise, Duke of, 1733b.
 Guitar, 1593a.
 Guiteau, Charles, 1447a.
 Guizot, Francois Pierre Guillaume, 1593b.
 Gulden, 1591b.
 Gulf Stream, 1593b, 2630a.
 Gulick, Luther Halsey, 655b, 1594b.
 Gull, 1595a.
 Gullet, 2636a.
 Gulliver's Travels, 1594b, 3485a.
 Gum, 1595a.
 Gum Arabic, 1595b.
 Gumbo, 1595b.
 Gumboil, 1595b.
 Gum Resins, 1595b.
 Gunboat, 1596a.
 Guncotton, 1596a.
 Gun Metal, 570a.
 Gunpowder, 1596a.
 Gunpowder Plot, 1596b.
 Gunther, 3302a.
 Gurnard, 1596b.
 Gustatory Nerve, 3519b.
 Gustave V, 1596b.
 Gustavus I, 1597a.
 Gustavus II, Adolphus, 1597a, 3567a.
 Gustavus III, 1597b.
 Gustavus IV, Adolphus, 1597b.
 Gustavus Vasa, 1597a.
 Gutenberg, Johannes, 1597b, 1823a, 2942a.
 Guthrie, Okla., 1598a.
 Gutta-percha, 1598b.
 Gymnasia, 1494a.
 Gymnasium, 1599a.
 Gymnastics, 1602b.

Hamilcar Barca

Gymnosperms, 517a, 518b, 1602b.
 Gypsies, 1603a.
 Gypsum, 1603a.
 Gypsy Moth, 1603b, 3656b.
 Gyroscope, 1604b.

H

H, 1605a.
 Haakon VII, 1605a.
 Haarlem, 1605a.
 Habakkuk, 1605b.
 Habeas Corpus, 1605b.
 Habib Ullah Khan, 32b.
 Habit, 1606a, 1950b, 2962a.
 Hackberry, 1607a, 2517a.
 Hackett, James Keteltas, 1607a.
 Hackmatack, 3508a.
 Haddock, 1607a.
 Hades, 1607a, 1666a.
 Hadj, 1607a.
 Hadji, 2376b.
 Hadley, Arthur Twining, 1607b.
 Hadrian, 1607b.
 Hadrian's Tomb, 1607b.
 Haeckel, Ernst, 1608a.
 Haemoglobin, 1608a.
 Haff, 1495a.
 Hagar, 1608a.
 Hagerstown, Md., 1608a.
 Hagfish, 1608a.
 Haggai, 1608b.
 Haggard, Henry Rider, 1608b.
 Hague, The, 1608b.
 Hague Peace Conference, 2761a.
 Hahnemann, Samuel Christian, 1609a, 1711a.
 Haig, Douglas, 1609b, 3921b.
 Hail, 1609b.
 Hail Columbia, 1610a.
 Hainan, 1610a.
 Hair, 1610a, 2843a.
 Hair Dressing, 1610b.
 Hair Dye, 1611b.
 Hairless Dog, 1611b.
 Hair Worm, 1611b.
 Haiti, 1611b.
 Hake, 1612b.
 Hakodate, 1613a.
 Halcyon, 1613a.
 Hale, Edward Everett, 1613a.
 Hale, Nathan, 1613b.
 Haleakala, 3618b.
 Halevy, Ludovic, 1613b.
 Halftone, 1614a.
 Haliburton, Thomas Chandler, 1614b.
 Halibut, 1614b.
 Halifax, Eng., 1614b.
 Halifax, N. S., 1615a.
 Halite, 3175b.
 Hall, Asaph, 1615a.
 Hall, Granville Stanley, 1615b.
 Hallam, Henry, 1615b.
 Halle, Germany, 1616a.
 Halleck, Fitz-Greene, 1616a.
 Hallelujah, 1616a.
 Hallet, Stephen H., 3814b.
 Halley, Edmund, 1616b.
 Halley's Comet, 897b.
 Hall of Columns, 3260b.
 Hall of Fame, 1616b.
 Hallowe'en, 1617a, 2633b.
 Hallucination, 1617a.
 Halo, 1617b.
 Halogens, 1617b.
 Hals, Frans, 1618a.
 Ham (Bible), 1618a.
 Ham (food), 1618a.
 Hamadryad (animal), 310a.
 Hamadryads (mythology), 2625b.
 Haman, 424b, 1618a.
 Hamburg, Germany, 1618a.
 Hamilcar Barca, 1618b.

The letter a. after a number, indicates column 1; the letter b. column 2.

- Hamilton, Alexander, 1618b, 3621a.
 Hamilton, Ohio, 1619a.
 Hamilton, Ont., 1619b.
 Hamlet, 1619b.
 Hamlin, Hannibal, 1620a.
 Hammer, 1620a.
 Hammer, Throwing the, 274a, 1620a.
 Hammerfest, Norway, 1620a.
 Hammerhead Shark, 1620b.
 Hammond (family), 1620b.
 Hammond, Ind., 1620b.
 Hammurabi, 311a.
 Hampden, John, 1621a.
 Hampshire Grants, 3760b.
 Hampton, Wade, 1621a.
 Hampton Normal and Agricultural Institute, 1621b.
 Hampton Roads Conference, 1622a.
 Hamster, 1622a.
 Hancock, John, 1622a.
 Hancock, Mich., 1622b.
 Hancock, Winfield Scott, 1622b.
 Hand, 1622b.
 Handball, 1622b.
 Handel, George Frederick, 1623b.
 Handicap, 1623b.
 Hand Lead, 3349b.
 Hand Organ, 1740b.
 Hangbird, 328a.
 Hang-chow, 1624a.
 Hanging, 1624a.
 Hanging Gardens of Babylon, 1624a, 3251a.
 Hankow, China, 1624b.
 Hanks, Nancy, 2109a.
 Hanna, Marcus Alonzo, 1624b.
 Hannibal, 1624b.
 Hannibal, Mo., 1625b.
 Hanoi, Indo-China, 1625b.
 Hanover (province), 1625b.
 Hanover, Germany, 1626a.
 Hanseatic League, 1626a.
 Hansel and Gretel, 1736b.
 Hansen, Gerhard, 1626b.
 Hanson, Ole, 3244a.
 Hapsburg, House of, 298a, 1626b.
 Hara-kiri, 1627a.
 Hardecante, 1627a.
 Hardening of the Arteries, 3218b.
 Hardhack, 3386b.
 Harding, Warren G., 1627a.
 Hardness, 1627a.
 Hardy, Thomas, 1627b.
 Hare, 1627b.
 Hare and the Tortoise, The, 2022b.
 Harebell, 654b.
 Harebell, 1628a.
 Harem, 1628a.
 Hargreaves, James, 1628b, 3386a.
 Harlan, John Marshall, 1628b.
 Harlequin, 1628b.
 Harmonica, 1629a.
 Harmonics, 1629a.
 Harmonium, 2678a.
 Harmony, 1629a, 2442a.
 Harmony of the Spheres, 1629b.
 Harmsworth, Alfred Charles William, 2598a.
 Harness, 1629b.
 Harness Antelope, 137a.
 Harold (England), 1230b.
 Harold II (England), 1630a.
 Harold (Norway), 1629b.
 Harold III (Norway), 1630a.
 Harp, 1630a.
 Harper, William Rainey, 1630b.
 Harper's Ferry, W. Va., 1630b.
 Harpies, 1631a.
 Harpoon, 1631a.
 Harpy, 1631a.
 Harraden, Beatrice, 1631a.
 Harrar, Abyssinia, 10a.
 Harrier, 2260a.
 Harriman, Edward Henry, 1631b.
 Harris, Joel Chandler, 1631b.
 Harris, William Torrey, 1632a.
 Harrisburg, Pa., 1632a.
 Harrison, Benjamin, 1632b.
 Harrison, Benjamin (President), 1632b.
 Harrison, Francis Burton, 1635b, 2819b.
 Harrison, William Henry, 1636a, 3584b.
 Harrod, James, 1941a.
 Harrow, 1637a.
 Hart, Albert Bushnell, 1637a.
 Harte, Francis Bret, 1637b.
 Hartebeest, 1638a.
 Hartford, Conn., 1638a.
 Hartford Convention, 1638b.
 Harthacnut, 1627a.
 Hartshorn, 113b, 1638b.
 Harun-al-Rashid, 1638b.
 Harvard, John, 1639b.
 Harvard University, 1639a.
 Harvester, The Modern, 3030b.
 Harvest Fish, 2897a.
 Harvest Fly, 819b.
 Harvestman, 1017a.
 Harvest Moon, 1639b.
 Harvey, George, 1640a.
 Harvey, William, 1640a.
 Harz Mountains, 1640a.
 Hasdrubal, 1640b.
 Hashish, 1640b.
 Hashishim, 253a.
 Hastings, Battle of, 1319b, 1640b.
 Hastings, Nebr., 1640b.
 Hastings, Warren, 1641a, 1784a.
 Hat, 1641a.
 Hathaway, Anne, 3267b.
 Hattiesburg, Miss., 1641b.
 Haunches, 158a.
 Hauptmann, Gerhart, 1641b.
 Havana, Cuba, 1642a.
 Havelock, Henry, 1642b.
 Haverhill, Mass., 1642b.
 Havre, France, 1643a.
 Hawaii, 1643a, 3617a.
 Hawaii National Park, 1644b, 2742a, 3618a.
 Hawk, 1646a.
 Hawk and Hen (game), 1440a.
 Hawkeye State, The 1825a.
 Hawking, 1295a.
 Hawkins, Anthony Hope, 1646a.
 Hawksbill, 1646b.
 Hawkweed, 1646b.
 Hawthorn, 1646b.
 Hawthorne, Julian, 1646b.
 Hawthorne, Nathaniel, 1646b, 3027a.
 Hay, 1647b.
 Hay, John, 1648a.
 Haydn, Josef, 1648b.
 Hayes, Rutherford Birchard, 1649a.
 Hay Fever, 1652a.
 Hayne, Robert Young, 1652a.
 Hay-Pauncefote Treaty, 1652b.
 Hays, Charles Melville, 1652b.
 Haywood, William D. 1653a.
 Haze, 1653a.
 Hazel, 1653b.
 Hazen, William Babcock, 1653b, 3300a.
 Hazing, 1653b.
 Hazleton, Pa., 1653b.
 Headache, 1654a.
 Headache Powders, 13a.
 Health, 1654a.
 Health, Bill of, 432a.
 Health, Boards of, 1654b.
 Health of the Child, 793a.
 Health Thrift, 3574b.
 Hearn, Lafcadio, 1654b.
 Hearst (family), 1654b.
 Heart, 1655b.
 Hearts (card game), 1656a.
 Heart Spasm, 124b.
 Heat, 1656b, 3563a.
 Heat, Unit of, 3670b.
 Heath, 1657b.
 Heath Family, 525a.
 Heating and Ventilation, 1658a.
 Heat Prostration, 3473a.
 Heaven, 1659b.
 Heaves, 1659b.
 Heavy Earth, 349a.
 Heavy Spar, 349b.
 Hebe, 1659b.
 Hebert, Jacques Rene, 1659b.
 Hebrew Language and Literature, 1660a.
 Hebrews, The Epistle to the, 1660b.
 Hebrides, 1661a.
 Hebron, 1661a.
 Hecate, 1661a.
 Hecia, 1661a.
 Hectograph, 944b.
 Hector, 1661b, 2458b.
 Hecuba, 1661b.
 Hedge Bindweed, 433b.
 Hedgehog, 1661b.
 Hedin, Sven Anders, 1662a.
 Hedjaz, 154a, 1662a, 3649b.
 Hegel, Georg Wilhelm Friedrich, 1662a.
 Hegira, 1662b, 2375b.
 Heidelberg, Germany, 1662b.
 Heidelberg University, 1663a.
 Height of Land, 662b, 2584b.
 Heilprin, Angelo, 1663a.
 Heimdall, 1663a.
 Heine, Heinrich, 1663a.
 Heir, 1663b.
 Heir Apparent, 1663b.
 Heir Presumptive, 1663b.
 Hel, 1663b.
 Helena, Ark., 1664a.
 Helena, Mont., 1664a.
 Helena of Montenegro, 3767b.
 Helen of Troy, 1664a, 1763a, 2458a, 2735b.
 Helgoland, 1664b.
 Helicon, 1664b.
 Heliograph, 1664b, 3301a.
 Heliopolis, 1665a.
 Helios, 1665a.
 Heliostat, 1664b.
 Heliotrope (gem), 1665a.
 Heliotrope (plant), 1665a.
 Helium, 1665b.
 Hell, 1666a.
 Hellebore, 1666a.
 Hellenica, 2955b.
 Hellespont, 1028a.
 Hell Gate, 1666a.
 Hell Gate Bridge, 158a.
 Helmet, 1666b.
 Helmholtz, Hermann von, 1666b.
 Heloise, 6a.
 Helots, 1666b.
 Helsingfors, Finland, 1667a.
 Helvetians, 1667a, 3489a.
 Hemans, Felicia Dorothea, 1667a.
 Hematite, 1667b, 1837a.
 Hemiptera, 1667b.
 Hemisphere, 1667b.
 Hemlock, 1667b, 1668a.
 Hemorrhage, 1668a.
 Hemp, 1668b.
 Henderson, Ky., 1669a.
 Hendricks, Thomas Andrews, 1669b.
 Hen Hawk, 1669b.
 Henna, 1669b.
 Hennepin, Louis, 1669b, 2348b.
 Henry, Joseph, 3328a.
 Henry, Patrick, 1673a.

Henry I (England), 1670a.
 Henry II (England), 1670a.
 Henry III (England), 1670b.
 Henry IV (England), 1670b.
 Henry V (England), 1670b.
 Henry VI (England), 1671a.
 Henry VII (England), 1671a.
 Henry VIII (England), 725b,
 992b, 1671a, 3041a.
 Henry III (France), 1672a.
 Henry IV (France), 1672a.
 Henry III (Holy Roman Em-
 peror), 1673a.
 Henry IV (Holy Roman Em-
 peror), 1673a.
 Henry VI (Holy Roman Em-
 peror), 1673a.
 Henry of Navarre, 1672a.
 Henry the Navigator, 1673b.
 Henschel, Georg, 1674a.
 Henty, George Alfred, 1674a.
 Hepatica, 1674a.
 Hepatic Duct, 1433b.
 Hephaestus, 3792a.
 Heppelwhite, George, 1427b.
 Heptameter, 2311b.
 Heptarchy, 1230a, 1674a.
 Hera, 1918a.
 Heraldry, 1674a.
 Herbarium, 1674b.
 Herbart, Johann Friedrich,
 1674b.
 Herbert, Victor, 1675a.
 Herbicides, 1675b.
 Herbivorous Animals, 1675b.
 Herbs, 1675b.
 Herculaneum, 1675b, 2897a.
 Hercules, 1676a.
 Hercules, Pillars of, 1676b.
 Hercules Beetle, 1676b.
 Heredity, 1244b, 1260b, 1677a.
 Herefords, 728b.
 Heretic, 1677a.
 Herjulfson, Bjarni, 3774b.
 Hermit, 1677b.
 Hermit, Crab, 1677a.
 Hermon, Mount, 1677b.
 Herne, James A. 1677b.
 Hernia, 1677b.
 Hero (mythology), 9a, 1678a.
 Herod Agrippa I, 1678a.
 Herod Agrippa II, 1678a.
 Herod Antipas, 1678b.
 Herodias, 3175a.
 Herodotus, 1678b.
 Herod the Great, 1678a.
 Heroes and Hero-worship,
 705b.
 Heroin, 1678b.
 Heron, 1679a.
 Herrera, Francesco, 1679a.
 Herrick, Robert Welch, 1679b.
 Herring, 1679b.
 Herring King, 3266a.
 Herschel, William, 1680a,
 2502a.
 Hesperides, 1680b.
 Hesperus, 1280b, 3753a.
 Hesse, 1680b.
 Hessian Fly, 1681a.
 Hessians, 1681b.
 Hewlett, Maurice Henry, 1681b.
 Hexameter, 2311b.
 Heyse, Paul, 1681b.
 Hezekiah, 1682a, 3306b, 3253a.
 Hiawatha, 1682a, 2025b.
 Hibben, John Grier, 1682a.
 Hibbing, Minn., 1682a.
 Hibernation, 1682a.
 Hibernia, 1682b.
 Hibernians, Ancient Order of,
 1682b.
 Hibiscus, 1682b.
 Hiccough, 1683a.
 Hichens, Robert Smythe, 1683a.
 Hickory, 1683b.
 Hicks, Elias, 2978a.
 Hicksite Quakers, 2978a.
 Hierarchy, 1683b.
 Hieroglyphics, 1683b.

Higginson, Thomas Went-
 worth, 1685a.
 High Church, 1235b.
 Highest Mountains, 2426a.
 High Frequency Currents,
 1209a.
 Highland Fling, 1025b.
 High-holder, 1346b.
 High Point, N. C., 1685a.
 High Priest, 1685a.
 High School, 1685b.
 High School, Technical, 3786a.
 High Seas, 1686b.
 High Water, 3579a.
 Hill, 1686b.
 Hill, Ambrose Powell, 1687a.
 Hill, David Bennett, 1687a.
 Hill, David Jayne, 1687a.
 Hill, James Jerome, 1687b.
 Hill, Rowland, 2546b, 2919b.
 Hillis, Newell Dwight, 1687b.
 Himalaya, 1688a.
 Himation, 1143b.
 Hincks, Francis, 1688b.
 Hindenburg, Paul von Benken-
 dorf, 1688b.
 Hindenburg Line, 3925a.
 Hindu-Kush Mountains, 1689a.
 Hindus, 1780a.
 Hindustan, 1689a.
 Hines, Walker D., 3001b.
 Hinge Joint, 1906b.
 Hinnom, Valley of, 1456b.
 Hippocampus, 1689a.
 Hippocrates, 1689b.
 Hippodrome, 1689b.
 Hippomenes, 2456b.
 Hippopotamus, 1689b.
 Hiram (king of Tyre), 1690a.
 Hiroshima, Japan, 1690a.
 Hirsch, Emil Gustav, 1690a.
 Hispania, 1690b.
 Histology, 1690b.
 Historical Map, 2247b.
 History, 1690b.
 History, Methods of Teaching,
 1698a.
 History of the United States,
 3699b.
 Hitites, 1702a.
 Hives, 1702a.
 Hoang-ho River, 1702b.
 Hoar, George Frisbie, 1702b.
 Hobart, Garrett Augustus,
 1702b.
 Hobart, Tasmania, 1703a.
 Hobbema, Meindert, 1703a.
 Hobby Horse, 427b.
 Hoboken, N. J., 1703a.
 Hobson, Richard Pearson,
 1703b.
 Hockey, 1703b.
 Hoe, Richard March, 1704b,
 2546b.
 Hoe, Robert, 1823a.
 Hofmann, Heinrich, 1704b.
 Hofmann, Josef, 1704b.
 Hog, 1705a.
 Hogarth, William, 1705a,
 2705b.
 Hogchoker, 3342a.
 Hogshead, 1705b, 3844a.
 Hogweed, 2998a.
 Hohenlinden, Battle of, 2471a.
 Hohenstaufen, 1705b.
 Hohenzollern (family), 1705b,
 2956a.
 Hojeda, 3356a.
 Holbein (family), 1706a.
 Holden, Edward Singleton,
 1706a.
 Holding Corporations, 3641b.
 Hole in the Ice (game), 1439b.
 Holiday, 1706b.
 Holland, 2512b.
 Holland, John Phillip, 1706b,
 3456a.
 Holland, Josiah Gilbert, 1707a.
 Holland, Mich., 1707a.
 Holley, Marietta, 1707a.

Holly, 1707a.
 Hollyhock, 1707b.
 Holmes, Elias Burton, 1707b.
 Holmes, Oliver Wendell, 1708a,
 3024a.
 Holmes, Oliver Wendell, Jr.,
 1709a.
 Holothuria, 3239a.
 Holstein-Friesian Cattle, 729a.
 Holy Alliance, 1709a.
 Holy City, 1709a.
 Holy Cross, Mount of the,
 3089a.
 Holy Family, 1709a.
 Holy Ghost, 1709b.
 Holy Grail, 513a, 1544a, 1545a.
 Holy Grail, Quest of the, 2b.
 Holy Land, The, 2712b.
 Holy of Holies, 3495b.
 Holyoke, Mass., 1709b.
 Holy Roman Empire, 1709b,
 1853a.
 Holyrood Palace, 1179b.
 Holy Sepulcher, Church of the,
 1889a.
 Holy Spirit Plant, 1711a.
 Holy Water, 1711a.
 Holy Week, 1711a.
 Homage, 1711a.
 Home, Daniel D. 3387a.
 Home Discipline, 1975a.
 Homeopathy, 1711a.
 Homer, 1711b.
 Homer, Louise, 1712a.
 Home Rule, 1712a, 1834b.
 Home Rule (India), 1783a.
 Homestead, 1713a.
 Homestead Laws, 2012b.
 Homesteads in Canada, 2015a.
 Home Sweet Home, 2760a.
 Homicide, 1713a.
 Homing Pigeon, 711b, 2851b.
 Honduras, 1713b.
 Hone, 1714a.
 Honey, 1714a.
 Honey Badger, 3010a.
 Honeybee, 373b.
 Honey Locust, 1714a.
 Honeysuckle, 1714b.
 Hong Kiang River, 3302b.
 Hong-kong, 1714b.
 Honolulu, Hawaii, 1715a.
 Honor, Titles of, 3586b.
 Hood, John Bell, 1715a.
 Hood, Mount, 1715b.
 Hood, Thomas, 1715b.
 Hoogly River, 1732b.
 Hookah, 2857b.
 Hooker, Joseph, 1715b.
 Hooker, Mount, 1716a.
 Hooker, Thomas, 1716a.
 Hookworm, 1716a.
 Hoopoe, 1716b.
 Hoosac Tunnel, 1716b.
 Hoover, Herbert Clark, 1717a.
 Hop, 1717b.
 Hope, Anthony, 1646a.
 Hopi, 1717b.
 Hopkins, Mark, 1717b.
 Hopkinsville, Ky., 1718a.
 Hopscotch, 1718a.
 Hoquiam, Wash., 1718b.
 Horace, 1718b.
 Horatius, 1719a.
 Horehound, 1719a.
 Horizon, 1719a.
 Horizontal Bar, 1599a.
 Horn (musical instrument),
 1719b.
 Horn (zoology), 1719b.
 Hornbeam, 1720a.
 Hornbill, 1720a.
 Hornblende, 1720a.
 Horned Toad, 1720b.
 Hornell, N. Y., 1720b.
 Hornet, 1720b.
 Horns Up (game), 1442a.
 Horoscope, 259b, 1721a.
 Horse, 1721a.
 Horse-chestnut, 1721b.

Horse Fair, 3741b.
 Horsefly, 1429a.
 Horse Latitudes, 1721b.
 Horse Mackerel, 3645a.
 Horse Power, 1722a.
 Horse Racing, 2993b.
 Horse-radish, 1722a.
 Horseshoe, 1722a.
 Horseshoe Crab, 1722b.
 Horsetail Rush, 1722b.
 Horseweed, 1345b.
 Horticulture, 1723a.
 Hosea, 1723a.
 Hosmer, Harriet, 1723b.
 Hospital, 1723b.
 Hospital Fever, 3663a.
 Hospital for the Insane, 1805a.
 Hostage, 1724a.
 Hotbed, 1724a.
 Hotchkiss, Benjamin Berkely, 1724b.
 Hotel, 1724b.
 Hotel de Ville, 1725a.
 Hot House, 1580b.
 Hot-pack Method, 683b.
 Hot Springs, 3562b, 3963b.
 Hot Springs, Ark., 1725a.
 Hot Springs Reservation, 2742a.
 Hottentots, 1725a.
 Houdon, Jean Antoine, 1725b.
 Hound, 1089b, 1725b.
 Hourglass, 1725b.
 Houseboat, 1726a.
 Houseleek, 1726a.
 House of Commons, 1560b.
 House of Commons (Canada), 2744b.
 House of Lords, 1560b.
 House of the Seven Gables, The, 1647a, 3172a.
 House of York, 3967b.
 House Snake, 2339b.
 Housing Problem, 1726a.
 Houston, Sam, 1726b, 3553a.
 Houston, Tex., 1727a, 3552a.
 Howard, Catharine, 1672a.
 How Baby Ray Got up in the Morning, 1963a.
 Howe, Elias, 1727a, 1823a, 3265a.
 Howe, Joseph, 1727b.
 Howe, Julia Ward, 1728a.
 Howe, Willam, 1728a.
 Howell, Clark, 1728a.
 Howells, Willam Dean, 1728b.
 Howitzer, 1729a.
 Howrah, India, 636b.
 Hubbard, Elbert, 1729a.
 Huckleberry, 1729a.
 Huckleberry Finn, Adventures of, 848a.
 Hudson, Henry, 1729b.
 Hudson, N. Y., 1729b.
 Hudson Bay, 1729b.
 Hudson Bay Railroad, 1730a.
 Hudson River, 1730a.
 Hudson River Tunnels, 3646a.
 Hudson's Bay Company, 1730b.
 Huerta, Victoriano, 1731b, 2322a, 3884b.
 Hughes, Charles Evans, 1731b.
 Hughes, James Laughlin, 1732a.
 Hughes, Sam, 1732a.
 Hughes, Thomas, 1732b.
 Hugli River, 1732b.
 Hugo, Victor Marie, 1732b.
 Huguenots, 348a, 1733b.
 Hula Girl, 3619a.
 Hull, Eng., 1734a.
 Hull, Que., 1734a.
 Hull, William, 1734b.
 Hull House, 1734b.
 Humane Societies, 996b, 997a.
 Human Period, 44a.
 Humbert I, 1734b.
 Humboldt, Friedrich Heinrich Alexander, 1735a.
 Hume, David, 1735b.

Humerus, 3318a.
 Humidity, 1735b, 1749a.
 Humming Bird, 1736a.
 Humperdinck, Engelbert, 1736b.
 Humphreys, West H., 1775b.
 Humus, 1736b, 3339a.
 Hundred Years' War, 1736b.
 Hungary, 1737a.
 Hunger, 1738a.
 Hunkers, 343b, 2887b.
 Huns, 1738b.
 Hunt, Helen Fiske, 1864b.
 Hunt, James Henry Leigh, 1738b.
 Hunt, Willam Holman, 1739a.
 Hunt, William Morris, 1739a.
 Hunting, 1739a.
 Hunting Leopard, 763a.
 Huntington, Ind., 1739b.
 Huntington, W. Va., 1739b.
 Hunyady, Janos, 1740a.
 Hurdle Races, 273b.
 Hurdling, 1740a.
 Hurdy-gurdy, 1740a.
 Huron, Lake, 1740b.
 Huron Indians, 1740b.
 Hurricane, 1741a.
 Husband and Wife, 1741a.
 Huss, John, 1741b.
 Hussites, 1742a.
 Hutchinson, Anne, 1742b, 2276a.
 Hutchinson, Kan., 1742b.
 Hutchinson, Thomas, 1742b.
 Hutuktu, 2387a.
 Huxley, Thomas Henry, 1743a.
 Hyacinth, 1743a.
 Hyacinthus, 1743b.
 Hyaloid Membrane, 1287b.
 Hyatt, Anna Vaughn, 1898a.
 Hybrid, 603b, 1743b.
 Hyderabad, India, 1743b.
 Hydra (mythology), 1744a.
 Hydra, Fresh-water, 1744a.
 Hydrangea, 1744b.
 Hydrate of Chloral, 809a.
 Hydrates, 1744b.
 Hydraulic Cement, 735b.
 Hydraulic Engine, 1744b.
 Hydraulic Press, 1747a.
 Hydraulic Ram, 1745a.
 Hydraulics, 1745b.
 Hydroaeroplane, 1363b.
 Hydrocarbons, 1096b, 1745b, 1746b.
 Hydrochloric Acid, 1745b.
 Hydrocyanic Acid, 2957b.
 Hydrofluoric Acid, 1746a.
 Hydrogen, 1746a.
 Hydrogen Dioxide, 1746b.
 Hydrogen Sulphide, 3467b, 3468a.
 Hydrography, 1746b.
 Hydrometer, 1746b.
 Hydrophobia, 1747a.
 Hydrophyte, 1747a.
 Hydrostatic Press, 1747a.
 Hydrostatics, 1747b.
 Hydrosulphuric Acid, 3468a.
 Hydrotherapy, 1748a.
 Hydroxide, 1744b.
 Hydroxyl, 1744b.
 Hyena, 1748a.
 Hygeia, 1748b.
 Hygiene, 1748b.
 Hygrometer, 1749a.
 Hyksos Kings, 1190b, 1749a.
 Hymen, 1749a.
 Hymns, National, 1749b.
 Hymns and Hymn Tunes, 1749b.
 Hyoid Bone, 3317b, 3594a.
 Hypatia, 1751a.
 Hypergeometry, 2280a.
 Hyperion, 1751a.
 Hypermetropia, 1751a.
 Hypnotism, 1751b.
 Hypodermic Injection, 1752a.
 Hypotenuse, 3633a.

Hypothesis, 1752a.
 Hyssop, 1752b.
 Hysteria, 1752b.

I

I, 1753a, 2682a.
 Iambic Meter, 2311b.
 Ibanez, Vincente Blasco, 1753a.
 Iberia, 1753a.
 Iberville, Pierre le Moyne, 1753a.
 Ibex, 1753b.
 Ibis, 1754a.
 Ibsen, Henrik, 1754a.
 Icarus, 1017b.
 Ice, 1754b.
 Iceberg, 1755a.
 Iceland, 1755b.
 Iceland Moss, 1756a.
 Iceland Spar, 1756b.
 Ice Plant, 1756b.
 Ice Yachting, 1756b.
 Ichneumon, 1757a.
 Ichneumon Flies, 1757a.
 Ichthyosaurus, 1757a.
 Iconoclasts, 1757b.
 Icterus, 1879b.
 Idaho, 1757b.
 Idaho, University of, 1761b.
 Ideal Feelings, 1306a.
 Idealism, 1761b.
 Ideas, Association of, 255b.
 Identity, The law of, 3570a.
 Ides, 1761b.
 Idiocy, 1805b.
 Idiom, 1761b.
 Idiot, 1762a.
 Idle Thoughts of an Idle Fellow, 1888a.
 Idol, 1762a.
 Idolatry, 1762a.
 Idun (mythology), 1762a.
 Idyl, 1762a.
 Idylls of the King, 3124a.
 Ieyasu, 3590b.
 Igloo, 1254a.
 Ignatius, Saint, 1762b.
 Igneous Rocks, 1474a, 1762b.
 Ignis Fatuus, 1762b.
 Igorrote, 1762b.
 Iguana, 1762b.
 Iguanodon, 1077a.
 Iguassu Falls, 1763a.
 I Have a Rendezvous with Death, 3248a.
 Ildefonso, Treaty of, 2543b.
 Ile de Bourbon, 3053b.
 Ileum, 1822a.
 Iliad, 14a, 1711b, 1763a.
 Illimani, 1763b.
 Illington, Margaret, 1763b.
 Illinois, 1764a.
 Illinois, University of, 1770a.
 Illinois and Michigan Canal, 1770a.
 Illinois Indians, 1770a.
 Illinois River, 1770b.
 Illiteracy, 1770b.
 Iloilo, P. I., 1771a.
 Ilium, 3639a.
 Il Trovatore, 1771a, 3755a.
 Image Worship, 1771b.
 Imagination, 788b, 1771b.
 Imago, 1807b.
 Imam, 2657a.
 Immaculate Conception, 2436b.
 Immigration and Emigration, 1773a, 3691b.
 Immoral Acts, 1259b.
 Immortality, 1774a.
 Immortelle, 1281a, 1774b.
 Immunity, 1774b.
 Impact Wheel, 3831b.
 Impeachment, 1774b.
 Imperator (ship), 3283b.
 Imperator (title), 1775b.
 Imperial Bushel, 612a.
 Imperial City, The, 2768b.

Imperialism, 1775b.
 Import Duties, 1011b.
 Impressionist School of Painting, 1776a.
 Impressment of Seamen, 1776a.
 Imprisonment, False, 1296b.
 Imprisonment for Debt, 1776a.
 Impulse, 1259a, 1951a, 3873a.
 Incandescent Light, 1203b.
 Incas, 1776b, 2799b.
 Inch Worms, 2287a.
 Incisors, 3527a.
 Inclined Plane, 1777a.
 Income Tax, 1777a.
 Incubator, 1778a.
 Indemnity, 1778a.
 Independence, Kan., 1778b.
 Independence, Mo., 1778b.
 Independence Day, 1778b.
 Independence Hall, 1779a.
 Independent Treasury, 3623a.
 Indeterminate Sentence, 1779a.
 Index Expurgatorius, 1779a.
 India, 1779b.
 India Ink, 1785a.
 Indiana, 1785b.
 Indianapolis, Ind., 1789b.
 Indian Architecture, 1790b.
 Indiana University, 1791a.
 Indian Chinkara, 1456b.
 Indian Fig, 2937b.
 Indian Hemp, 1091a.
 Indian Ichneumon, 1757a.
 Indian Mallow, 1791a.
 Indian Ocean, 1791a.
 Indian Root, 3385a.
 Indians, American, 1791b.
 Indian Summer, 1796a.
 Indian Territory, 1796b.
 Indian Turnip, 1860a.
 India Rubber, 3126b.
 Indicolite, 3602b.
 Indigo, 1796b.
 Indigo Bird, 1797a.
 Indium, 1797a.
 Indo-China, 1797a.
 Indoor Baseball, 1797a.
 Indris, 2083a.
 Induction (logic), 1797b.
 Induction, Electric, 1201b, 1797b.
 Induction Coil, 1797b.
 Inductive Method, 1798a.
 Inductive Philosophy, 2823a.
 Indulgence, 1798b.
 Indurite, 3329a.
 Indus River, 1799a.
 Industrial School, 1799a.
 Industrial Workers of the World, 1799a, 3493b.
 Industries in the United States, 3685a.
 Inertia, 1799b.
 Infant, 2355a.
 Infantile Paralysis, 1800a.
 Infant Mortality, 1800a.
 Infantry, 226a, 1800b.
 Infection, 1800b.
 Inferior Conjunction, 917a.
 Inflammatory Rheumatism, 3059b.
 In Flanders Fields, 2199b.
 Inflection, 2049b.
 Influenza, 785a, 1801a.
 Infusoria, 1801a.
 Ingelow, Jean, 1801b.
 Ingersoll, Ont., 1801b.
 Ingersoll, Robert Green, 1801b.
 Inheritance Tax, 1801b.
 Inhibition, 3873b.
 Initiative (government), 1802a.
 Initiative (psychology), 788b.
 Injunction, 1802b.
 Ink, 1802b.
 Inkberry, 2882b.
 Inland Revenue, 1819a.
 In Loco Parentis, 2734b.
 Inness, George, 1803a.
 Innocent (Popes), 1803b.

Innocents, Feast of Holy, 1804a.
 Innominate Bones, 3318b.
 Innuits, 1254a.
 Inoculation, 1804a.
 Inquest, 1804a.
 Inquisition, The, 1804a.
 Insane Asylum, 1805a.
 Insanity, 1805b.
 Insect, 1807a, 2487b, 2491b.
 Insecticides, 1806a.
 Insectivora, 1806b.
 Insignia, 1810b.
 Insolvency, 1812a.
 Insomnia, 1812a.
 Inspector-General, 225b.
 Inspiration, 549b.
 Instinct, 1812b, 1951a.
 Institute of France, 1812b.
 Instrumental Music, 1813a.
 Insulator, 1201b, 1813a.
 Insulin, 1069a, 1813b.
 Insurance, 1813b.
 Insurance Broker, 569a.
 Intaglio, 1815b, 2931a, 3229b.
 Intelligence, Animal, 127b.
 Intensive Farming, 1815b.
 Intercolonial Railway, 3002b.
 Interest (economics), 1084b, 1816a, 3724b, 3794a.
 Interest (psychology), 1817b.
 Interior, Dept. of the, 1818a.
 Interjection, 1818b.
 Interlaken, Switzerland, 1818b.
 Intermezzo, 1818b.
 Internal Revenue, 1818b.
 International Code of Signals, 3300a.
 International Copyright, 945b.
 International Date Line, 1819a.
 Internationalism, 1820a.
 International Law, 1820b, 2067a.
 International News Service, 254b, 1655a.
 International Peace Conference, 2761a.
 International Relations, 1697b.
 Interne, 1724a.
 Internuncio, 2622a.
 Interstate Commerce Act, 1821b.
 Interstate Commerce Commission, 3001a.
 Intestacy, 1822a.
 Intestine, 1822a.
 In Time's Swing, 2044b.
 Intrados, 158a.
 Invalides, Hotel des, 1822b, 2737b.
 Invalid Pension Acts, 2782a.
 Invention, 1822b.
 Invertebrates, 1823a.
 Invincible Armada, 219a.
 Involution, 1823b.
 Io, 1823b.
 Iodine, 1824a.
 Iodoform, 1824a.
 Iola, Kans., 1824a.
 Ionia, 1824b.
 Ionian Islands, 1824b.
 Ionic Order, 895b.
 I. O. U. 1824b.
 Iowa, 1825a.
 Iowa, University of, 1828a.
 Iowa City, Ia., 1828b.
 Iowa Indians, 1828b.
 Iowa River, 1828b.
 Iowa State College of Agriculture and Mechanic Arts, 1828b.
 Ipecac, 1828b.
 Ipecacuanha, 1829a.
 Iphigenia, 1829a.
 Iphigenia in Tauris, 1524b.
 Iquique, Chile, 1829a.
 Irade, 1829b.
 Iran, 1829b.
 Iranians, 1829b.
 Iraq, 1829b.

Irawadi River, 1829b.
 Ireland, 1830a.
 Ireland, John, 1835a.
 Iridium, 1835b.
 Iridosmine, 1835b.
 Iris (mythology), 1835b.
 Iris (plant), 1835b.
 Irish Lord, 3229a.
 Irish Moss, 1836a.
 Irish Sea, 1836a.
 Iritis, 1836a.
 Irkutsk, Siberia, 1836b.
 Iron, 1836b, 3678a, 3686b.
 Iron Age, 1839a.
 Iron Cross, 1839b.
 Iron Crown of Lombardy, 752b, 1839b.
 Iron Gate, 1839b.
 Iron Mask, The Man with the, 1839b.
 Iron Mountain, 1840a.
 Iron Mountain, Mich., 1840a.
 Iron Rust, 3147b.
 Ironton, Ohio, 1840a.
 Ironwood, 1720a, 1840a.
 Ironwood, Mich., 1840b.
 Irony, 1840b.
 Iroquoian Indians, 1840b.
 Iroquois Theatre Fire, 3557a.
 Irrawaddy River, 1829b.
 Irrigation, 1841a.
 Irrigation in Canada, 1843b.
 Irving, Henry, 1845b.
 Irving, Washington, 1846a.
 Isaac, 406a, 1846b.
 Isaacs, Rufus Daniel, 3029b.
 Isabella of Castile, 1846b, 3373b.
 Isaiah, 1846b.
 Ishikari River, 1873b.
 Ishmael, 1608a, 1847a.
 Ishpeming, Mich., 1847a.
 Isinglass, 1847a, 2324a.
 Isis, 1847a.
 Islam, 1847b.
 Island, 1847b.
 Island of Rhode Island, 3062b.
 Isle of Man, 1847b.
 Isle of Pines, 1848a.
 Isles of the Blessed, 1847b.
 Isle of Wight, 1848a.
 Isle Royale, 1848a.
 Isobaric Lines, 1848a.
 Isocrates, 1848b.
 Isothermal Lines, 1848b.
 Ispahan, Persia, 1848b.
 Ispahan Rugs, 3130a.
 Israels, Josef, 1849a.
 Isthmian Games, 1849a.
 Isthmus, 1849a, 2428b.
 Italia Irredenta, 1850a.
 Italian Language, 1849b.
 Italian Literature, 2122b.
 Italian Somaliland, 3344b.
 Italy, 1850a.
 Italy in the World War, 3920b.
 Itasca, Lake, 1856a, 2364b.
 Itch, 1856a.
 Itch Mite, 1856a.
 Ithaca, 1856a.
 Ithaca, N. Y., 1856b.
 Ito, Hirobumi, 1856b.
 Iturbide, Augustin de, 1857a.
 Ivan the Terrible, 1857a, 3142b.
 Ivory, 1857a.
 Ivory Black, 499a.
 Ivory Coast, 1857b.
 Ivory Palm, 1858a.
 Ivy, 1858a.
 Ixion, 1858b.
 Ixtacihuatl, Mount, 2319b.

J

J, 1859a.
 Jabiru, 1859a, 3428b.
 Jacana, 1859a.
 Jackal, 1859b.
 Jackdaws, 1859b.

Jack-in-the-pulpit, 1860a.
 Jacksnipe, 2185a, 3331b.
 Jack-rabbit, 1628a.
 Jackson, Andrew, 1860b.
 Jackson, Helen Fiske Hunt, 1864b.
 Jackson, Mich., 1864b.
 Jackson, Miss., 1864b.
 Jackson, Tenn., 1865a.
 Jackson, Thomas Jonathan, 1865a.
 Jacksonville, Fla., 1866a.
 Jacksonville, Ill., 1866a.
 Jackstones, 1866b.
 Jackstraws, 1866b.
 Jacob, 408a, 1866b, 2995b.
 Jacobins, 1105a, 1866b.
 Jacobites, 1867a.
 Jacquard, Joseph Marie, 1867a.
 Jacquard Loom, 3839b.
 Jade, 1867a, 2506a.
 Jaffa, Palestine, 1867a.
 Jagannatha, 1913a.
 Jaguar, 1867b.
 Jahn, Friedrich Ludwig, 1867b.
 Jail Fever, 3663b.
 Jaipur, 1868a.
 Jalap, 1868a.
 Jamaica, 1868b.
 Jamaica Pepper, 2853b.
 James I, 1869a.
 James II, 1869b.
 James, Edmund Janes, 1869b.
 James, Henry, 1870a.
 James, Saint (the Greater), 1870a.
 James, Saint (the Less), 1870b.
 James, William, 1870b.
 James Bay, 1870b.
 Jameson, Leander Starr, 1870b.
 James River, 1871a.
 Jamestown, N. Y., 1871a.
 Jamestown, Va., 1871a, 3701b.
 Jane Eyre, 570a.
 Janesville, Wis., 1871a.
 January, 1871b.
 Janus, 1872a.
 Japan, 1872b, 3612a.
 Japanese Art, 1876b.
 Japanned Leather, 2756a.
 Japanning, 1878a.
 Japan Stream, 1997a, 2630a.
 Japheth, 1878b.
 Japura, 1878b.
 Jardin des Plantes, 515b.
 Jarvis, Anna, 2424a.
 Jasmine, 1878b.
 Jason, 1879a.
 Jasper, 1879a.
 Jasper, William, 1879a.
 Jasper Park, 2743a.
 Jassy, Rumania, 1879a.
 Jaundice, 1879b.
 Java, 1879b.
 Jay, 1880a.
 Jay, John, 1880b.
 Jay Treaty, 1881a.
 Jeannette, The, 2606a.
 Jebel Errahm, 155b.
 Jefferson, Joseph, 1881a.
 Jefferson, Thomas, 1881b.
 Jefferson City, Mo., 1885b.
 Jeffersonville, Ind., 1885b.
 Jehoshaphat, 1886a.
 Jehovah, 1886a.
 Jehu, 1886a.
 Jejulum, 1822a.
 Jellicoe, John Rushworth, 1886a, 3923b.
 Jelly, 1886b.
 Jellyfish, 1886b.
 Jena, Battle of, 1886b.
 Jenghis Khan, 1460a.
 Jenner, Edward, 1886b.
 Jephthah, 1887a.
 Jerboa, 1887a.
 Jeremiah, 1887a.
 Jericho, 413b, 1887b.
 Jericho Rose, 1887b.
 Jeroboam, 1888a.

Jerome, Jerome Klapka, 1888a.
 Jersey Cattle, 729a.
 Jersey City, N. J., 1888a.
 Jerusalem, 1888b.
 Jessamine, 1878b.
 Jester, 1890b.
 Jesuits, 1890b.
 Jesus Christ, 1891b.
 Jesus, Lover of My Soul, 1750b.
 Jet, 1893a.
 Jetty, 1893a.
 Jewelry, 1893b.
 Jewfish, 1894a.
 Jews, 1894a.
 Jew's-harp, 1896b.
 Jeypore, India, 1868a.
 Jezebel, 419a, 1896b.
 Jigger, 1896b.
 Jimson Weed, 3447a.
 Jinrikisha, 1897a, 3612b.
 Joachim, Joseph, 1897a.
 Joannes Island, 2248a.
 Joan of Arc, 1897a, 3059b.
 Job, 1898a.
 Jochebed, 410a.
 Joffre, Joseph Jacques Cesaire, 1898a.
 Johannesburg, South Africa, 1898b.
 John, King, (England), 1899a.
 John, Knights of Saint, 1899b.
 John (Popes), 1899a.
 John, Saint, 1899b.
 John Bull, 1900a.
 John III Sobieski, 1899b.
 Johnny-jump-up, 3774b.
 John of Gaunt, Duke of Lancaster, 1900a.
 Johns Hopkins University, 1900a.
 Johnson, Andrew, 1775b, 1900b, 3544b.
 Johnson, Hiram Warren, 1904a, 3112b.
 Johnson, Richard Mentor, 1904a.
 Johnson, Samuel, 1904a.
 Johnson City, Tenn., 1904b.
 Johnston, Albert Sidney, 1905a.
 Johnston, Joseph Eggleston, 1905a.
 Johnston, Mary, 1905b.
 Johnstown, N. Y., 1906a.
 Johnstown, Pa., 1906a.
 John the Baptist, 1898b.
 Joint (anatomy), 1906a.
 Joint (geology), 1906b.
 Joint Stock Company, 1907a.
 Jokai, Maurus, 1907a.
 Joliba River, 2571b.
 Joliet, Ill., 1907a.
 Joliet, Louis, 1907a.
 Joly De Lothbiniere, Henri, Gustave, 1907b.
 Jonah, 1907b.
 Jonathan, 417a, 1907b.
 Jones, Edith Newbold, 3856b.
 Jones, John Paul, 1907b.
 Jonquil, 1908a, 2474a.
 Jonson, Ben, 1908a.
 Joplin, Mo., 1909a.
 Jordan, David Starr, 1909b.
 Jordan River, 1909a.
 Joseph (husband of Mary), 1910a.
 Joseph (son of Jacob), 1910a, 3442a.
 Josephine, Marie Rose, 1910a, 2472a.
 Joseph of Arimathea, 1892b.
 Josephus, Flavius, 1910a.
 Joshua, 1910b.
 Josiah, 1910b.
 Journalism, School of, 1910b.
 Journal to Stella, 3485a.
 Jove (mythology), 1918b.
 Juan de Fuca, Strait of, 1911a.
 Juan Fernandez Island, 1911a, 3085a, 3249b.

Juarez, Benito Pablo, 1911b.
 Jubilee, Year of, 1911b.
 Judah, 1911b.
 Judaism, 1894a.
 Judas, 1912a.
 Judas Iscariot, 1911b.
 Judas Tree, 1912a.
 Jude, 1912a.
 Judea, 1912a.
 Judge, 1912a.
 Judge-Advocate-General, 226a.
 Judges, Book of, 1912b.
 Judgment (law), 1263a, 1912b, 2946a.
 Judgment (psychology), 1912b, 1263a.
 Judicial Department, 3694a.
 Judicial Department of Canada, 1912b.
 Judicial Oath, 2627b.
 Judson, Harry Pratt, 1913a.
 Juggernaut, 1913a.
 Jugo-Slavia, 301b, 1913b.
 Jugo-Slavs, 2995a.
 Jugular Vein, 1914a.
 Jugurtha, 1914a, 3102a.
 Juijitsu, 1914b, 3948b.
 Jujube, 1914a.
 Jujutsu, 1914b, 3948b.
 Julep, 1914b.
 Julian Calender, 637b.
 Julian the Apostate, 1914b.
 Juliet and Romeo, 3106b.
 Julius (Popes), 1915a.
 July, 1915a.
 July, Column of, 1916a.
 July Revolution, 1916a.
 Jumping Bean, 1916a.
 Jumping Mouse, 1887a, 1916a.
 Junco, 1916a.
 June, 1916b.
 Juneau, Alaska, 1917a.
 Juneau, Solomon, 2343b.
 Juneberry, 1917a.
 June Bug, 1917a.
 Jungfrau, 1917a.
 Jungle Books, 1984a.
 Jungle Fowl, 1917b.
 Junior High School, 1686a.
 Juniper, 1917b.
 Junius Letters, The, 1917b.
 Juno, 1917b.
 Jupiter (plant), 1918a.
 Jupiter (mythology), 1918b.
 Jura Mountains, 1919a.
 Jurassic Period, 1919a.
 Jury and Trial by Jury, 1919b, 2945b.
 Justice (title), 1912a.
 Justice, Department of, 1920a.
 Justice of the Peace, 1920a.
 Justianian I, 1920a.
 Just-So-Stories, 1984a.
 Jute, 1920b.
 Jutes, 1921a.
 Jutland, 1921a.
 Juvenal, Decimus Junius Juvenalis, 1921a.
 Juvenile Court, 1921b.

K

K, 1922a.
 Kaaba, 1922a.
 Kabara-goya, 2387b.
 Kabul, Afghanistan, 1922a.
 Kadiak Bear, 368b.
 Kadiak Island, 1922a.
 Kaffir Corn, 1922b.
 Kaffirs, 1922b.
 Kaiser, 1922b.
 Kaiser-blume, 962b, 1923a.
 Kalahari Desert, 1923a.
 Kalakaua, 1645b.
 Kalamazoo, Mich., 1923a.
 Kaleidoscope, 1923a.
 Kalends, 1923b.
 Kalevala, 1923b.
 Kalispell, Mont., 1923b.

Kalmia, 1923b.
 Kalmucks, 1924a.
 Kalsomine, 635a.
 Kamerun, Germany, 1924a.
 Kamloops, B. C., 1924a.
 Kamtchatka, 1924b.
 Kanakas, 1924b.
 Kanawha River, 1924b.
 Kandahar, Afghanistan, 1924b.
 Kane, Elisha Kent, 1925a.
 Kangaroo, 1925a.
 Kankakee, Ill., 1925b.
 Kansa Indians, 1933a.
 Kansas, 1925b.
 Kansas, University of, 1930a.
 Kansas City, Kan., 1930b.
 Kansas City, Mo., 1930b.
 Kansas-Nebraska Bill, 1931a.
 Kansas River, 1931b.
 Kant, Immanuel, 1931b.
 Kaolin, 1932a.
 Karakorum Mountains, 1932a.
 Karl I, (Austria-Hungary), 753a.
 Karlowitz, Peace of, 3652a.
 Karlsbad, Bohemia, 705a.
 Karlsruhe, Germany, 705a.
 Karnak, Egypt, 3557a, 3570a.
 Kashgar, Turkestan, 1932a.
 Kashmir, India, 1932b.
 Kassel, 718a.
 Katahdin, Mount, 1932b.
 Kata-kana, 1873b.
 Kates, Who are These, 1243a.
 Katrine, Loch, 1932b.
 Kattegat, 728b.
 Katydid, 1933a.
 Kaulbach, Wilhelm von, 1933a.
 Kaunitz, Wenzel Anton Dominik, 1933a.
 Kaw Indians, 1933a.
 Kayak, 1254b.
 Kazan, Russia, 1933b.
 Kearny, Philip, 1933b.
 Kearsarge, The, 840b.
 Keats, John, 1933b.
 Kedzie Mixture, 1806a.
 Keeley, Leslie, 1934a.
 Keeley Cure, 1934a.
 Keene, Laura, 1934a.
 Keene, N. H., 1934b.
 Keewatin, 1934b.
 Keller, Helen Adams, 1934b.
 Kellogg, Clara Louise, 1934b.
 Kelp, 1935a.
 Kelvin, Wm. Thomson, 1935a.
 Kemal, Mustapha, 1935a.
 Kendall, Amos, 1935a.
 Kenesaw Mountain, Battle of, 1935b.
 Kenilworth, Eng., 1935b.
 Kennan, George, 1935b.
 Kennebec River, 1936a.
 Kenneth (king), 3223b.
 Kenora, Ont., 1936a.
 Kenosha, Wis., 1936a.
 Kent, James, 1936a.
 Kentucky, 1936b.
 Kentucky, State University of, 1941b.
 Kentucky and Virginia Resolutions, 1941b.
 Kentucky Cardinal, 703b.
 Keokuk, Iowa, 1942a.
 Kepler, Johann, 1942a.
 Kerensky, Alexander, 3245a.
 Kerosene, 1942b.
 Kerosene Emulsion, 1806a.
 Kestrel, 1942b.
 Ketchup, 1942b.
 Kettledrum, 1146a.
 Kewanee, Ill., 1943a.
 Key (music), 1943a.
 Key, Francis Scott, 1943a, 3407a.
 Keystone, 158a.
 Keystone State, 2775a.
 Key West, Fla., 1943b.
 Khaki, 1943b.
 Khamsin, 1944a.

Khan, 1944a.
 Kharkov, Russia, 1944a.
 Khartum, Egypt, 1944a.
 Khedive, 1190a, 1944b.
 Khiva, 1944b.
 Khufu, 769a.
 Khyber Pass, 1944b.
 Kiao-Chau, China, 1944b, 3919a.
 Kickapoo Indians, 1945a.
 Kicking Horse Pass, 73a, 561a.
 Kidd, William, 1945a.
 Kidnapping, 1945a.
 Kidneys, The, 1945a.
 Kieft, William, 2560a.
 Kiel, Germany, 1945b.
 Kiel Canal, 1945b.
 Kiev, Russia, 1946a.
 Kilauea, 1643b, 1946b, 3618b.
 Kilimanjaro, 1946b.
 Killarney, Lakes of, 1946b.
 Killdeer, 1946b.
 Kiln, 1947a.
 Kilogram, 1947a.
 Kilogrammeter, 1947a.
 Kilometer, 1947a.
 Kilowatt, 1947a.
 Kilowatt-hour, 1204b.
 Kimberley, South Africa, 1947a.
 Kindergarten, 1947b.
 Kindergarten Games, 1955a.
 Kindergarten Gifts, 1954a.
 Kinematics, 1981b.
 Kinetics, 1159a, 1225a, 3410b.
 Kinetic Theory of Gases, 1450b.
 Kinetoscope, 1823a.
 King, 1981b.
 King Arthur, 236b.
 Kingbird, 1981b.
 King Charles South Land, 3580b.
 Kingfisher, 1982a.
 King George's War, 1412b.
 King James's Bible, 404b.
 Kinglet, 1982b.
 King-maker, 3807b.
 King Philip, 1982b.
 Kings, Books of, 1982b.
 King's Counsel, 1982b.
 Kingsley, Charles, 1982b.
 King's Mountain, Battle of, 1983a.
 Kings of England, 1230b.
 King's Spear, 252a.
 Kingston, Jamaica, 1983a.
 Kingston, N. Y., 1983a.
 Kingston, Ont., 1983b.
 King William's War, 1412a.
 Kiolen Mountains, 3480b.
 Kioto, Japan, 1997b.
 Kiowa Indians, 1983b.
 Kipling, Rudyard, 1983b.
 Kirghiz, 1984a.
 Kishinev, Russia, 1984b.
 Kitchen Cabinet, 1984b.
 Kitchener, Horatio Herbert, 1984b.
 Kitchener, Ont., 1985a.
 Kitchen Middens, 1985a.
 Kite (bird), 1985b.
 Kites, 1985b.
 Kittiwake, 1988a.
 Kjolen Mountains, 1269b.
 Klamath, 1988a.
 Kleptomania, 1988a.
 Klondike, 1988a.
 Kneipp, Sebastian, 1988b.
 Kneip, Sebastian, 1988b.
 Knickerbocker's History of New York, 1846a.
 Knife, 1988b.
 Knighthood, Orders of, 1988b.
 Knights Hospitalers of Saint John, 1899b.
 Knights of Columbus, 1989a.
 Knights of Labor, 1989a.
 Knights of Malta, 1899b.
 Knights of Pythias, 1989a.

Knights of Rhodes, 1899b.
 Knights Templars, 3537a.
 Knitting Machine, 1989b.
 Knobs, The, 1937a.
 Knockout Drops, 139b.
 Knot, 1990a.
 Knot (nautical), 1990a, 3843b.
 Knotgrass, 1990a.
 Knowing, 2958b.
 Know-Nothings, 1991a, 2890a.
 Knox, Henry, 1991a.
 Knox, John, 1991a, 3042a.
 Knox, Philander Chase, 1991b.
 Knoxville, Tenn., 1992a.
 Koala, 1992a.
 Kobe, Japan, 1992a.
 Koch, Robert, 1992b.
 Kochanska, Marcelline, 3250b.
 Kodiak Island, 1922a.
 Koh-i-noor Diamond, 1070b, 1992b.
 Kohl-rabi, 1992b.
 Kokomo, Ind., 1992b.
 Kolchak, Admiral, 3138b, 3295a.
 Kongfutsse, 912a.
 Kongo, 912b.
 Konigsberg, Germany, 1993a.
 Koodoo, 137a, 1993a.
 Kootenay, 1993a.
 Kootenay River, 1993b.
 Koran, 1993b.
 Kordofan, 1994a.
 Korea, 948a.
 Kosciusko, Thaddeus, 1994a, 2884a.
 Kossuth, Louis, 1994a.
 Koumis, 1994b.
 Kovno, Poland, 1994b.
 Krefeld, Germany, 1994b.
 Kremlin, 1994b, 2420b.
 Kreutzer Sonata, The, 3592a.
 Kronstadt, Russia, 1995a.
 Kropotkin, Peter, 1995a.
 Kruger, Stephanus Johannes Paulus, 1995b, 3343b.
 Krupp, Friedrich Alfred, 1995b.
 Kryolite, 999b.
 Krypton, 1996a.
 Kubelik, Jan, 1996a.
 Kublai Khan, 802b, 1142a, 1996a.
 Kudu, 1993a.
 Kufic, 1007a.
 Ku-Klux Klan, 1996a, 3711b.
 Kultur, 3914b.
 Kumiss, 1994b.
 Kumquat, 1996b.
 Kun, Bela, 1738a.
 Kurdistan, 1996b.
 Kurile Islands, 1996b.
 Kuro Siwo, 1997a.
 Kuskokwim River, 1997a.
 Kyanite, 1997b.
 Kyoto, 1997b.

L

L, 1998a.
 Labiatae, 1998a.
 LaBoheme, 2965b.
 Labor, Department of, 1998a.
 Labor, Division of, 1998b.
 Labor Bureau, 3667b.
 Labor Day, 1999a.
 Labor Legislation, 1999a.
 Labor Organizations, 1999b.
 Labrador, 2000a.
 Labrador Current, 2000b.
 Labradorite, 1307b, 2000b.
 Labrador Tea, 2000b.
 Laburnum, 2000b.
 Labyrinth, 2001a.
 Labyrinth (ear), 1163b.
 Lac, 2001a.
 Lac (coin), 2001b.
 Laccadive Islands, 2001b.
 Lace, 2001b.
 Lacedaemon, 3376b, 3377a.

Lace-winged Flies, 2001b.
 Lachine, 2002a.
 Lacrymal Glands, 1289a, 2002a.
 Lackawanna River, 2002a.
 Laconia, 2002a.
 Laconia, N. H., 2002a.
 Lacquer, 2002b.
 Lacrosse, 2002b.
 La Crosse, Wis., 2003b.
 Lacteals, 2003b.
 Lactic Acid, 2004a.
 Lactose, 2337b.
 Ladies of Hell, 3225b.
 Lading, Bill of, 432a.
 Ladoga, Lake, 2004a.
 Ladrone Islands, 2004a.
 Lady, 1151b.
 Ladybird, 379a, 2004a, 3188b.
 Ladysmith, 2004a.
 Lady's Slipper, 2004b.
 LaFarge, John, 2004b, 3398b.
 Lafayette, Ind., 2005a.
 Lafayette, Marquis de, 2005a.
 Lafayette National Park, 340a, 2742a.
 LaFollette, Robert Marion, 2006a.
 Lafontaine, Jean de, 2006b.
 Lafontaine, Louis Hypolite, 2006b.
 Lagerlof, Selma, 2007a.
 La Gioconda, 2704a.
 Lago d' Averno, 305b.
 Lago Maggiore, 2217b.
 Lagoon, 2007a.
 Lagthing, 2611a.
 La Guayra, Venezuela, 2007a.
 Lahore, India, 2007a.
 Laisser Faire, 2007b.
 Lak, 2001b.
 Lake, 2007b.
 Lake Agassiz, 2007b.
 Lake Charles, La., 2008a.
 Lake Dwellings, 2008a.
 Lake of the Woods, 2008b.
 Lake School, 2008b.
 Lakes-to-the-Gulf Waterway, 2365a.
 Lakh, 3134b.
 Lalla Rookh, 3259a.
 Lamaism, 2008b.
 Lamar, Lucius Quintus Cincinnatus, 2008b.
 Lamarck, Jean Baptiste Pierre, 2009a.
 Lamb, Charles, 2009a.
 Lamb Kill, 1924a.
 Lamentations, 2009b.
 Laminae, 372b.
 Lammergeier, 2009b.
 La Moynes, Jean Baptiste, 2543b.
 Lamp, 2010a.
 Lampblack, 2010a.
 Lamprey, 2010a.
 Lanai, 3617b.
 Lancaster, House of, 2010b, 3118b.
 Lancaster, Ohio, 2010b.
 Lancaster, Pa., 2010b.
 Lance, 2011a.
 Lancelot of the Lake, 2011a.
 Lancet Fish, 2011a.
 Lancewood, 2011b.
 Land and Sea Breezes, 2011b.
 Land Crab, 2011b.
 Landis, Kenesaw Mountain, 2012a.
 Land Measurement, 2300b.
 Land Office, 2014a.
 Land of the Midnight Sun, 2608b.
 Land of the Rising Sun, 3612a.
 Land of Steady Habits, 918a.
 Land of the White Elephant, 3291b.
 Landor, Walter Savage, 2012a.
 Lands, Public, 2012a.

Lands, Travels in Distant, 3612a.
 Landscape Gardening, 2015a.
 Landseer, Edwin, 2015b.
 Land's End, 2015b.
 Landsmaal, 2610b.
 Landsting, 1057b.
 Lanfranc, Archbishop, 2015b.
 Lang, Andrew, 2015b.
 Langland, William, 2016a.
 Langley, Samuel Pierpont, 1361a, 2016a.
 Langtry, Mrs. Lillie, 2016a.
 Language, Universal, 3719b.
 Language and Grammar, 2016b.
 Language of Flowers, 1355a.
 Languages, Origin of, 2820b.
 Languages of the World, 2056b.
 Lanier, Sidney, 2057a.
 Lansdowne, Henry Charles Keith, 2057a.
 Lansing, Mich., 2057b.
 Lantern Fish, 2057b.
 Lantern Fly, 2057b.
 Laocoon, The, 3232b.
 Lao-tze, 912a.
 La Paz, Bolivia, 2058a.
 Lapis Lazuli, 2058a, 461a.
 Laplace, Pierre Simon, 2058b.
 Lapland, 2058b.
 La Plata, Argentine, 2058b.
 La Porte, Ind., 2059a.
 Lapwing, 2059a.
 Laramie, Wyo., 2059a.
 Larceny, 2059b.
 Larch, 2059b, 3508a.
 Lard, 2060a.
 Laredo, Tex., 2060a.
 Lares and Penates, 2060a.
 Lark, 2060b.
 Larkspur, 2060b.
 Lars Porsena, 3100b.
 Larva, 616a, 1807b, 2060b.
 Laryngitis, 2060b.
 Larynx, 541b, 2061a.
 La Salle, Ill., 2061b.
 La Salle, Rene-Robert Cavellier, 2061b.
 Lassa, Tibet, 2093b.
 Lassalle, Ferdinand, 2061b.
 Lassen Volcanic National Park, 2742b.
 Last Couple Out (game), 1441b.
 Last Days of Pompeii, 600b.
 Last Judgment, The, 2325a, 3314b.
 Last Supper, The, 3774a.
 Las Vegas, N. Mex., 2062a.
 Lateral Moraines, 2410a.
 Lateran, 2062a.
 Latex, 3126b.
 Lathe, 2062a.
 Lathrop, Julia Clifford, 2062b.
 Latimer, Hugh, 2062b.
 Latin Cross, 994a.
 Latin Language, 2063a.
 Latin Literature, 2122a.
 Latitude, 2063b.
 Latium, 2063b.
 Latter Day Saints, Church of Jesus Christ, 2063b, 2413a.
 La Traviata, 1106a, 3755a.
 Latvia, 2063b.
 Laud, William, 2063b.
 Laudanum, 2064a, 2664b.
 Lauder, Harry, 2064a.
 Laughing Gas, 2064b.
 Laughlin, James L., 2064b.
 Laureate, 2878b.
 Laurel, 2064b.
 Laurel, Miss., 2065a.
 Laurence, Marquez, 2919a.
 Laurentian Mountains, 2065a.
 Laurier, Wilfrid, 2065a.
 Laurium, Mich., 2065b.
 Laut, Agnes Christina, 2066a.
 Lava, 2066a.

Laval Montmorency, Francois Xavier de, 2066b.
 Laval University, 2066a.
 Lavender, 2066b.
 Law, 2066b.
 Law, Andrew Bonar, 2067b.
 Law, John, 2067b, 2365b.
 Law, Sumptuary, 3470a.
 Lawn Tennis, 2068a.
 Law of the Twelve Tables, 3100a, 3657a.
 Lawrence, James, 770b, 2068b.
 Lawrence, Kan., 2069a.
 Lawrence, Mass., 2069a.
 Law Schools, 2069b.
 Lawsuit, 2945b.
 Lawton, Henry Ware, 2069b.
 Lays of Ancient Rome, 1719a.
 Lazarus, 2069b.
 Lazurite, 2058a.
 Lead (metal), 2069b.
 Lead, Kindly Light, 2538a.
 Lead, Sounding, 2070a.
 Lead, S. D., 2070b.
 Lead Glance, 1431a.
 Lead Poisoning, 2070b.
 Leadville, Colo., 2070b.
 Leaf Insects, 2071a.
 Leaf Lard, 2060a.
 League, 2071a.
 League of Nations, 2478b.
 League to Enforce Peace, 2071a.
 Leander, 9a.
 Leap Year, 2071b.
 Learning, Formal Steps in, 2313a.
 Lease, 2071b.
 Leather, 2072a, 3687a.
 Leatherback Turtle, 2073a.
 Leatherstocking Tales, 940a.
 Leavenworth, Kan., 2073b.
 Leaves, 2073b, 2488a, 3627b.
 Lebanon, Mountains of, 2075a.
 Lebanon, Pa., 2075b.
 Lecky, William Edward Hartpole, 2075b.
 Lecompton Constitution, 2075b.
 Le Conte, Joseph, 2076a.
 Ledum, 2000b.
 Ledy Jeassu, 11a.
 Lee, Ann, 3267a.
 Lee, Charles, 2076a.
 Lee, Henry, 2076b.
 Lee, Richard Henry, 2076b.
 Lee, Robert Edward, 2077a.
 Leech, 2077b.
 Leeds, Eng., 2078a.
 Leek, 2078a.
 Leeward Islands, 2078a.
 LeGallienne, Richard, 2078a.
 Legal Tender, 2385b, 3538a.
 Legate, 2078b, 2622a.
 Legend, 2078b.
 Legend of Sleepy Hollow, 1846a.
 Legerdemain, 2078b.
 Leghorn, Italy, 2079a.
 Legion, 2079a.
 Legion of Honor, 2079a.
 Legislative Assembly, 2079b.
 Legislative Department, 3693a.
 Legislature, 2079b.
 Leguminous Plants, 2080a.
 Lehigh River, 2080b.
 Leibnitz, Gottfried Wilhelm, 2080b.
 Leicester, Eng., 2080b.
 Leicester, Robert Dudley, 2081a.
 Leidy, Joseph, 2081a.
 Leif Ericson, 1250b.
 Leighton, Frederick, 2081a.
 Leipzig, Germany, 2081b.
 Leipzig, Battles of, 2081b.
 Leland Stanford Junior University, 2082a.
 Leman, Lake, 1459a.
 Lemberg, Galicia, 2082b.
 Lemming, 2082b.

Lemnos, 30a.
 Le Moine, James MacPherson, 2082b.
 Lemon, 2083a.
 Lemur, 2083a.
 Lena River, 2083b.
 L'Enfant, Pierre Charles, 3813a.
 Length of Life, 2160a.
 Lenine, Nikolai, 493b, 2084a, 3139a, 3145b, 3638a.
 Lenni-Lenape, 1052b.
 Lenox, James, 2084a.
 Lens, 2084b.
 Lens, France, 2085a.
 Lent, 2085b.
 Lentil, 2085b.
 Leo (astronomy), 2085b.
 Leo (Popes), 2085b.
 Leo X, 3029b.
 Leominster, Mass., 2086a.
 Leon, Nicaragua, 2086b.
 Leonardo da Vinci, 3773b.
 Leonidas, 2086b, 2795a.
 Leopard, 2086b, 2726b.
 Leopold II, 2087a.
 Lepage, Bastien, 2706a.
 Lepanto, Gulf of, 948b.
 LePas, 1730a, 2753b.
 Lepidus, Marcus Aemilius, 285a, 2087a.
 Leprosy, 2087a.
 Lepta, 1110b.
 Lesage, Alain Rene, 2087b.
 Lesbos, 30a.
 Les Huguenots, 2317a.
 Les Miserables, 1732b, 2087b.
 Lesseps, Ferdinand de, 2088a, 2720b, 3462a.
 Lethbridge, Alta., 2088a.
 Lethe, 2088b.
 Letter of Credit, 2088b.
 Letter of Marque and Reprisal, 2256a, 2944b.
 Letter Writing, 2088b.
 Letts, 2089b.
 Lettuce, 2089b.
 Leutze, Emanuel, 2089b.
 Levant, 2089b, 3650b.
 Levee, 2090a.
 Level, 2090a.
 Lever, 2090a.
 Lever, Charles James, 2091a.
 Leverwood, 1720a.
 Leviathan (Biblical), 2091a.
 Leviathan (ship), 3286a.
 Levis, Que., 2091b.
 Levites, 2091b.
 Leviticus, 2091b.
 Lewis, Meriwether, 2091b.
 Lewis and Clark Expedition, 2092a.
 Lewis and Clark Exposition, 2092a.
 Lewiston, Ida., 2092b.
 Lewiston, Maine, 2092b.
 Lexington, Battle of, 2093a.
 Lexington, Ky., 2092b.
 Leyden, Netherlands, 2093a.
 Leyden Jar, 2093b.
 Lhasa, Tibet, 2093b.
 Liao-tung Peninsula, 3143a.
 Libau, Courland, 2093b.
 Libel, 2094a, 3321a.
 Liberal, 2094a, 3861a.
 Liberal Republican Party, 2094b, 2889b.
 Liberia, 2094b.
 Liberty, Religious, 3046a.
 Liberty, Sons of, 3346a.
 Liberty, Statue of, 2095a.
 Liberty Bell, 2095a.
 Liberty Bonds, 2095a, 3933a.
 Liberty Cap, 2095b.
 Liberty Loans, 2095a, 3933a.
 Liberty of the Press, 2095b.
 Liberty Party, 2095b, 2890b.
 Library, 2096a.
 Library of Congress, 2097a.
 License, 2097a.

Lichens, 2097b.
 Licinian Law, 3100a.
 Lick, James, 2098a.
 Lick Observatory, 2098a.
 Licorice, 2098a.
 Lictors, 2098a.
 Liebig, Justus, 2098b.
 Liebknecht, Karl, 1502b, 2098b, 3377b.
 Liechtenstein, 2098b.
 Liege, Belgium, 2099a.
 Lien, Belgium, 2099a.
 Lieutenant, 2099a.
 Lieutenant-General, 2099b.
 Lieutenant-Governor, 2099b.
 Life, Length of, 2417b.
 Lifeboat, 2100a.
 Life Estate, 1256a.
 Life Insurance, 1814b.
 Life in the Desert, 3157a.
 Life of Samuel Johnson, 515a.
 Life Preserver, 2100a.
 Life-Saving Service, 866b, 2100a.
 Life-Saving Gun and Rocket, 2100b.
 Lift Pump, 2969b.
 Ligament, 2100b.
 Liggett, Hunter, 2100b.
 Light, 2101a.
 Light, Polarization of, 2884b.
 Lighthall, William Dover, 2103b.
 Lighthouse, 2103b.
 Lightning, 1467a, 2104b.
 Lightning Rod, 2105b.
 Lightship, 2104b.
 Lignite, 863a, 2105b.
 Li Hung Chang, Earl, 2105b.
 Lilac, 2106a.
 Liliaceae, 523a.
 Liliuokalani, Lydia Kamekeha, 1645b, 2106a, 3619b.
 Lille, France, 2106a.
 Lily, 2106b.
 Lily Family, 523a.
 Lily of the Valley, 2106b.
 Lima, Ohio, 2107a.
 Lima, Peru, 2107a.
 Lime (fruit), 2107a.
 Lime (chemistry), 2107b.
 Lime Light, 2107b.
 Limerick, 2107b.
 Limerick, Ireland, 2108a.
 Limestone, 594b, 2108a.
 Limited Monarchy, 2382a.
 Limited Partnership, 2753a.
 Limoges, France, 2108b.
 Limon, Costa Rica, 2108b.
 Limonite, 2108b.
 Limpet, 2108b.
 Lincoln, Abraham, 2109a.
 Lincoln, Eng., 2113b.
 Lincoln, Ill., 2114a.
 Lincoln, Neb., 2114a.
 Lincoln Highway, 2114b.
 Lind, Jenny, 2115a.
 Linden, 2115a.
 Lindsey, Benjamin Barr, 2115b.
 Line, 2115b.
 Linen, 2115b.
 Ling, Pehr Henrik, 2116a.
 Linguistics, 2820a.
 Liniment, 2116a.
 Linnaea, 2116a.
 Linnaeus, 2116a.
 Linne, Karl von, 2116a.
 Linnet, 2116b.
 Linoleum, 2116b.
 Linotype, 2117a.
 Linseed, 2117a.
 Linseed Oil, 1344b, 2117b.
 Linseed Meal, 2117b.
 Lion, 2117b.
 Lion and the Mouse, The, 2023a.
 Lion of Lucerne, 2118a.
 Lipari Islands, 2118a.
 Lippi, Filippo, 2118a, 2703b.
 Lip Reading, 2118b.

Lipton, Thomas, 2118b.
 Liquid, 1747b, 2119a.
 Liquid Air, 2119a.
 Liquidambar, 2119a.
 Liquid Fire, 2119a.
 Liquid Measure, 2315b.
 Liquors, 1082b.
 Lira, 2119b.
 Lisbon, Portugal, 2119b.
 Lisgar, Lord, 2119b.
 Lister, Joseph, 2120a, 3477a.
 Liszt, Franz, 2120a.
 Litany, 2120a.
 Liter, 2120a.
 Literature, 2120b.
 Literature, Boys and Girls in, 2129b.
 Literature of Canada, 2139a.
 Lithium, 2141a.
 Lithography, 2141a.
 Lithotomy, 2142a.
 Lithuania, 2142a.
 Litmus, 2142b.
 Little Chief Hare, 2852a.
 Little Church Round the Corner, 2557b.
 Little Dipper, 369a.
 Little England, 3622a.
 Little Falls, New York, 2142b.
 Little Lord Fauntleroy, 608a.
 Little Men, 77a.
 Little Pig that Wouldn't Go Over the Stile, The, 3434b.
 Little Red Hen and the Grain of Wheat, 1959b.
 Little Red Riding Hood, 2791a.
 Little Rhody, 3061b.
 Little Rock, Ark., 2142b.
 Little Russians, 3148a.
 Little Saint Bernard, 3158b.
 Little Venice, 3750b.
 Little Women, 77b.
 Liturgy, 2143a.
 Liu-Kiu, 2167a.
 Live-forever, 1726a.
 Liver, 2143a.
 Livermore, Mary Ashton Rice, 2143b.
 Liverpool, Eng., 2143b.
 Liverworts, 2144a.
 Live Stock, 3685a.
 Livingstone, David, 2144a, 3403b.
 Livingston, Robert R. 2178a.
 Livius, 2145a.
 Livonia, 2145a, 3074b.
 Livre, 2145a.
 Livy, 2145a.
 Lizard, 2145b.
 Llama, 2146a.
 Llano Estacado, 3549b.
 Llanos, 2146a, 3352a.
 Lloyd George, David, 1482a.
 Lloyds, 2146b.
 Loam, 2146b, 3339a.
 Loanda, Angola, 3168b.
 Lobby and Lobbying, 2146b.
 Lobelia, 2146b.
 Loblolly Pine, 2855b.
 Lobster, 2146b.
 Lobworm, 2147b.
 Local Government, 3695a.
 Local Option, 2147b.
 Lochinvar, 2147b.
 Lock, 2148a.
 Lock (engineering), 2148b.
 Locke, John, 2148b.
 Lockhart, John Gibson, 3237b.
 Lockjaw, 3548a.
 Lockout, 2149a.
 Lockport, N. Y., 2149a.
 Lockwood, Belva Ann Bennett, 2149a.
 Loco-Focos, 2149a.
 Locomotive, 1823a, 2149a, 3421a.
 Locomotor Ataxia, 2151b.
 Loco Weed, 2151b.
 Locust (insect), 819b, 2152a.
 Locust (tree), 2152b.

Lodge, Henry Cabot, 2152b.
 Lodz, Poland, 2152b.
 Loeb, Jacques, 2152b.
 Loess, 2153a.
 Lofoten Islands, 2153a.
 Log, 2153b.
 Logan, John A., 2153b, 2295b.
 Logan, Utah, 2154a.
 Loganberry, 2154a.
 Logansport, Ind., 2154a.
 Logarithms, 2154a.
 Loggerhead, 1646b.
 Logic, 2154a.
 Logwood, 2155a.
 Lohengrin, 2155a.
 Loire, 2155a.
 Lok, 2155a, 2461b.
 Lollards, 2155b.
 Lombards, 2155b.
 Lombardy, 2155b.
 Lomond, Loch, 2156a.
 London, Eng., 2156a.
 London, Greater, 2156b.
 London, Jack, 2159a.
 London, Ont., 2159b.
 London, Tower of, 3604a.
 London Company, 2159b, 3701a, 3779b.
 Lone Star State, 3549a.
 Long Branch, N. J., 2159b.
 Longevity, 2160a.
 Longfellow, Henry Wadsworth, 2160b, 3015a, 3021b.
 Long Island, 2161a.
 Long Island, Battle of, 2161b.
 Longitude, 2161b.
 Longitude and Time, 2162a.
 Long Parliament, 2166b.
 Longstreet, James, 2166b.
 Loo-Choo, 2167a.
 Loon, 1084b.
 Loopers, 2287a.
 Loquat, 2167a.
 Lorain, Ohio, 2167a.
 Lord, 1151b, 2167b.
 Lord Chief Justice, 2167b.
 Lord Justice, 1912a.
 Lord Ullin's Daughter, 2042b.
 Lorelei, 2167b.
 Lorimer, George Horace, 2167b.
 Loris, 2167b.
 Lorraine, 103b.
 Lory, 2168a.
 Los Angeles, Calif., 2168a.
 Lossing, Benson John, 2169b.
 Lost Chord, The, 3466b.
 Lost River, 1468a.
 Lottery, 2169b.
 Lotus, 2169b.
 Lotus Eaters, 2170a.
 Loubet, Emile, 2170a.
 Louis I, 2170a.
 Louis IX, 999a, 2170b.
 Louis XI, 2170b.
 Louis XII, 2170b.
 Louis XIII, 2171a.
 Louis XIV, 2171a.
 Louis XV, 2171b, 2897a.
 Louis XVI, 2172a.
 Louis XVII, 2172b.
 Louis XVIII, 2172b.
 Louisburg, Sieges of, 2173a.
 Louis the German, 2172b.
 Louis the Pious, 709a, 752b.
 Louise, Lake, 2173a.
 Louisiana, 2173a.
 Louisiana Purchase, 2177b.
 Louisiana Purchase Exposition, 2178a.
 Louisiana State University, 2178b.
 Louis Philippe, 2178b.
 Louisville, Ky., 2178b.
 Louse, 2179b.
 Louvain, Belgium, 2180a.
 Louvre, The, 2180a.
 Love Apple, 3592b.
 Lovejoy, Elijah Parish, 2180b.
 Lover, Samuel, 2180b.

Low, Seth, 2180b.
 Low Church, 1235b.
 Lowell, Abbott Lawrence, 2181a.
 Lowell, James Russell, 2181a, 3024b.
 Lowell, Mass., 2182a.
 Lower California, 2182b.
 Lower Canada, 2984b.
 Low German, 2871b.
 Low Water, 3579a.
 Loyola, Ignatius, 2182b.
 Lubbock, John, 2183a.
 Lubeck, Germany, 2183a.
 Lucerne, Switzerland, 2183b.
 Lucerne, Lake, 2183b.
 Lu-Chu, 2167a.
 Lucia di Lammermoor, 1106a.
 Lucifer, 2183b, 3753a.
 Lucknow, British India, 2183b.
 Lucretia, 2184a.
 Ludendorff, Erich, 2184a.
 Ludington, Mich., 2184b.
 Ludlow Commission, 2721a.
 Lugbait, 2147b.
 Lugworm, 2147b.
 Luke, Saint, 2184b.
 Lumbago, 2185a, 3060a.
 Lumber, 2185a.
 Lumbering in Canada, 665a.
 Lumber Jack, 1880b.
 Lumber Measurements, 2301a.
 Luminous Paint, 2701b.
 Lumpfish, 2187a.
 Lumpsucker, 2187a.
 Lumpy Jaw, 2187b.
 Luna, 2187b.
 Lunacy, 2187b.
 Lunar Caustic, 729b, 2187b.
 Lundy's Lane, Battle of, 2188a.
 Lungs, 2188a.
 Lungwort, 2188b.
 Lunula, 2466b.
 Lupercalia, 2188b.
 Lupine, 2189a.
 Lupus, 2189a.
 Luray Caverns, 2189a.
 Lusitania, 2189a, 3283b, 3715a, 3924a.
 Lute, 2189b.
 Lutetia, 2739a.
 Luther, Martin, 2190a, 3039b.
 Lutherans, 2191a.
 Lutzen, Battles of, 2191a.
 Luxembourg, 2191a.
 Luxembourg, Palace of, 2737b.
 Luxemburg, Rosa, 1502b, 3377b.
 Luxor, Egypt, 2191b.
 Luzon, P. I., 2815b, 3617a.
 Lyceum, 2192a.
 Lycurgus, 2192a.
 Lydia, 2192a.
 Lye, 139b.
 Lyell, Charles, 2192a.
 Lymph, 2192a.
 Lymphatics, 2192b.
 Lynchburg, Va., 2192b.
 Lynch Law, 2193a.
 Lynn, Mass., 2193a.
 Lynx, 2193a.
 Lyons, France, 2193b.
 Lyre, 2194a.
 Lyre Bird, 2194a.
 Lyric Poetry, 2194a.
 Lysander, 2194b.
 Lysimachia, 2194b.
 Lysippus, 2195a.
 Lytton, Edward Robert Bulwer, 2195b.

M

M, 2196a.
 Maartens, Maarten, 2196a.
 Mabie, Hamilton Wright, 2196a.
 Mac, 842b, 2467b.
 Macaroni, 2197a.

Macaulay, Thomas Babington, 2197a.
 Macaw, 2197b.
 Macbeth, 2197b.
 Maccabees, 2198a.
 Maccabees, Knights of the, 2198a.
 MacDonald, J. Ramsay, 2200a.
 Macdonald, John Alexander, 2200a.
 MacDowell, Edward A., 2201a.
 Mace (spice), 2201a.
 Mace (symbol of office), 2201a.
 Macedonia, 1574b, 2201a.
 Macgillicuddy's Reeks, 1830b.
 Macgregor, Robert, 3085a.
 Machiavelli, Niccolo, 2202a.
 Machine, 2202b.
 Machine Gun, 2203a.
 Mackay (family), 2203b.
 Mackensen, Field Marshal von, 3922b.
 Mackenzie, 2204a.
 Mackenzie, Alexander (statesman), 2204a.
 Mackenzie, Alexander (explorer), 2204a.
 Mackenzie, William, 2204a.
 Mackenzie, William Lyon, 2204b.
 Mackenzie River, 2204b.
 Mackerel, 2205a.
 Mackinac Island, 2205a.
 MacMahon, Maria Edme Patrice, 2208b.
 MacMurragh, Dermot, 1833a.
 Macon, Ga., 2209a.
 Madagascar, 2209a.
 Madame Butterfly, 2965b.
 Madame de Stael, 3397a.
 Madder, 2210a.
 Madeira Island, 2210a.
 Madeira River, 2210a.
 Madeleine, The, 2738a.
 Madero, Francisco, 2210b, 2322a, 3884b.
 Madison, Dolly, 2214a.
 Madison, James, 2210b.
 Madison, Wis., 2214a.
 Madonna, 2214b.
 Madras (province), 2215b.
 Madras, British India, 2215b.
 Madrid, Spain, 2216a.
 Maelstrom, 2216b.
 Maeterlinck, Maurice, 2216b.
 Mafia, 2216b.
 Magdalen, Mary, 2217a.
 Magdalen River, 2217a.
 Magdalen Islands, 2217a.
 Magdeburg, Germany, 2217a.
 Magellan, Ferdinand, 2217b.
 Magellan, Strait of, 2217b.
 Maggiore, Lake, 2217b.
 Magi, 2217b.
 Magic, 2217b.
 Magic Lantern, 2218a.
 Magic Music (game), 1441b.
 Magna Charta, 1899b, 2218b.
 Magnesia, 2218b.
 Magnesian Limestone, 1092b.
 Magnesium, 2218b.
 Magnet, 2219a.
 Magnetic Equator, 1248b, 2219a.
 Magnetic Field, 2219b.
 Magnetic Iron Ore, 2220a.
 Magnetic Needle, 2219b.
 Magnetic Poles, 2219b, 2885a.
 Magnetism, 1167b, 2219a.
 Magnetite, 2220a.
 Magneto-Electric Machine, 2220a.
 Magnificat, 2220a.
 Magnitude Relation, 2619b.
 Magnitudes of Stars, 3406b.
 Magnolia, 2220a.
 Magnolia State, 2360a.
 Magpie, 533b, 2220b.
 Magyars, 2221a.
 Mahabharata, 2221a.

Mahan, Alfred Thayer, 2221a.
 Mahanoy City, Pa., 2221a.
 Maharajah, 3005b.
 Mahdi, 1191b, 2221b.
 Mahogany, 2221b.
 Mahomet, 2375a.
 Mahrattas, 2221b.
 Maia, 2872b.
 Maidenhair, 2222a.
 Maid of Orleans, 1897a.
 Mail Matter, Classification, 2921a.
 Maiming, 2222a.
 Main, 2222a.
 Maine, 2222b.
 Maine, The, 1003b, 3375a.
 Maine, University of, 2227b.
 Main Question, 2748b.
 Maintenon, Madame de, 2171b, 2227b.
 Mainz, Germany, 2227b.
 Maize, 951a.
 Majesty, 2228a.
 Majolica, 2228a.
 Major (military), 2228a.
 Majorca, 2228a.
 Major-General, 2228b.
 Makaw, 2228b.
 Malacca, Strait of, 2228b.
 Malachi, 2228b.
 Malachite, 943b, 2228b.
 Malaga, 2228b.
 Malagasy, 2209a.
 Malaria, 2229a.
 Malay Archipelago, 2229a.
 Malay Peninsula, 2229b.
 Malden, Mass, 2229b.
 Maldive Islands, 2229b.
 Malfeasance, 2230a.
 Malice, 2230a.
 Malines, Belgium, 2230a.
 Malispena Glacier, 1516b.
 Mall, The, 3813a.
 Mallard Duck, 1149b.
 Malleability, 2230a.
 Mallow, 2230a.
 Malmo, Sweden, 2230b.
 Malory, Thomas, 2230b.
 Malpractice, 2230b.
 Malt, 552b, 2230b.
 Malta, Island of, 2231a.
 Maltese Cross, 994a.
 Malvern Hill, Battle of, 2231a.
 Mamelukes, 1191a, 2231b.
 Mammals, 2231b.
 Mammoth, 2232a.
 Mammoth Cave, 2232b.
 Mammoth Hot Springs, 3963b.
 Man, 2233a.
 Managua, 2233a.
 Manaos, Brazil, 2233b.
 Manatee, 2233b.
 Manchester, Eng., 2233b.
 Manchester, N. H., 2234b.
 Manchuria, 2234b.
 Manchus, 2234b.
 Mandalay, India, 2235a.
 Mandamus, 3949b.
 Mandan, 2235a.
 Mandarin, 2235b.
 Mandeville, John de, 2235b.
 Mandingo, 2235b.
 Mandolin, 2235b.
 Mandrake, 2236a.
 Mandrill, 2236a.
 Manganese, 2236a.
 Manganese Bronze, 570a.
 Mange, 2236a.
 Mango, 2236b.
 Mangrove, 2236b.
 Manhattan Island, N. Y., 2237a.
 Manheim, Germany, 2237a.
 Mania, 1805b.
 Manila, P. I., 2237a, 3614b.
 Manila Bay, Battle of, 2238a.
 Manila Hemp, 1668b, 2817a.
 Man in the Moon, 266b.
 Manistee, Mich., 2238a.
 Manitoba, 2238b.
 Manitoba Lake, 2241a.

Manitou, Colo., 2241a.
 Manitoulin Islands, 2241b.
 Manitowoc, Wis., 2241b.
 Mankato, Minn., 2241b.
 Mann, Donald, 2242a.
 Mann, Horace, 2242a.
 Manna, 2242b.
 Mannering, Mary, 2242b.
 Manning, Henry Edward, 2242b.
 Man of War, 1418b.
 Mansard Roof, 2243a.
 Mansfield, Ohio, 2243a.
 Mansfield, Richard, 2243a.
 Manslaughter, 2435b.
 Mantell, Robert Bruce, 2243b.
 Mantis, 2243b.
 Manual Training, 2244a.
 Manuel II, 704b, 2245b, 2918a.
 Manures, 2245b.
 Manuscripts, 2246a.
 Man Without a Country, The, 1613b, 2246b.
 Manx, 1847b, 2246b.
 Manzanillo, Cuba, 2247a.
 Maoris, 2247a, 2563b.
 Map, 1469b, 2247a.
 Maple, 2247b.
 Maple Creek Antelope Reserve, 2743a.
 Maple Sugar, 3463b.
 Maquari, 3428b.
 Maracaibo, Lake, 2248a.
 Maracaibo, Venezuela, 2248a.
 Marajo Island, 2248a.
 Marat, Jean Paul, 2248a.
 Marathon, 1319b, 2248b.
 Marble, 594b, 2248b.
 Marble Faun, The, 1303a.
 Marbles, 2249a.
 March, 2249a.
 Marco Bozzaris, 1616a.
 Marconi, Guglielmo, 1823a, 2250a.
 Marcus Aurelius, 3104a.
 Marcy, Mount, 25b.
 Marcy, William Learned, 2250b.
 Mardi Gras, 2250b, 3291a.
 Mare Island, 2250b.
 Marengo, Battle of, 2250b.
 Margaret of Anjou, 1671a.
 Margaret of Valois, 1672b.
 Margins, 480b.
 Maria Christina, 2251a.
 Marguerite, 517b.
 Maria Louisa, 2251a, 2472a.
 Mariana Islands, 2004a.
 Maria Theresa, 2251a, 3459b.
 Maria Theresa Dollar, 10b.
 Maria Adelaide, 2191b.
 Marie Antoinette, 2251b.
 Marietta, Ohio, 2252a.
 Marigold, 2252b.
 Marigold Window, 3119a.
 Marine Corps, 2252b.
 Marine Disasters, 3286a.
 Marinette, Wis., 2253a.
 Marion, Francis, 2253b.
 Marion, Ind., 2253b.
 Marion, Ohio, 2253b.
 Mariotte's Law, 535b.
 Marius, Caius, 2254a, 3102a, 3466b.
 Marjoram, 2254a.
 Mark, 2254a.
 Mark, Saint, 2254b.
 Mark Antony, 142a.
 Markham, Edwin, 2254b.
 Markham, William, 2813a.
 Marl, 2254b.
 Marlborough, John Churchill, 2254b.
 Marlowe, Christopher, 2255a.
 Marlowe, Julia, 2255a, 3348a.
 Marmora, Sea of, 2255b.
 Marmoset, 2255b.
 Marmot, 2255b.
 Marne, Battles of, 3917b.
 Marne River, 2256a.

Marque and Reprisal, Letters of, 2256a, 2944b.
 Marquesas Islands, 2256b.
 Marquette, Jacques, 2256b.
 Marquette, Mich., 2256b.
 Marquis, 2256b.
 Marriage, 2257a.
 Mars (planet), 2257a.
 Mars (mythology), 2258a.
 Marseillaise Hymn, 2258a, 3123b.
 Marseilles, France, 2258b.
 Marsh, 2259a.
 Marshal, 2259a.
 Marshall, John, 19a, 2259a.
 Marshall, Tex., 2259b.
 Marshall, Thomas Riley, 2259b.
 Marshalltown, Iowa, 2260a.
 Marsh Fever, 2229a.
 Marsh Gas, 2311b.
 Marsh Hawk, 2260a.
 Mars Hill, 2260a.
 Marsh Mallow, 2260a.
 Marsh Trefoil, 585a.
 Marston Moor, 2260a.
 Marsupials, 2260b.
 Martel, Charles, 709a.
 Marten, 2260b.
 Martha (opera), 1353a.
 Martha's Vineyard, 2261a.
 Martial, Marcus Valerius, 2261a.
 Martial Law, 2261a.
 Martin, 2261a.
 Martinique Island, 2261b, 3621b.
 Martinsburg, W. Va., 2261b.
 Martin's Ferry, Ohio, 2261b.
 Martyrs, 2261b.
 Marx, Karl, 2262a.
 Mary, The Virgin, 2262b, 3093a.
 Mary I, 2262a.
 Mary II, 2262a.
 Maryland, 2262b.
 Mary Magdalen, 1892b.
 Mary Queen of Scots, 1214b, 2266a.
 Mary Stuart, 2266a.
 Masaryk, Thomas, 1015b, 2266b.
 Mascagni, Pietro, 2267a.
 Masefield, John, 2267a.
 Mash, 552b, 1082b.
 Mashonaland, 2267b.
 Mask, 2267b.
 Maskat, 2437a.
 Mason, George, 2227a.
 Mason, James Murray, 2267b, 3631b.
 Mason, John, 2268a.
 Mason and Dixon's Line, 2268a.
 Mason Bee, 2268a.
 Mason City, Iowa, 2268a.
 Masonry (secret order), 2268b.
 Masonry (in industry), 2269a.
 Masque, 2269b.
 Mass, 2270a.
 Massachusetts, 2270a.
 Massachusetts Bay, 2276b.
 Massachusetts Bay Colony, 2277a, 3701b.
 Massachusetts Institute of Technology, 2277a.
 Massacre of Saint Bartholomew, 348a.
 Massage, 2277b.
 Massa's in the Cold, Cold Ground, 1385b.
 Massasoit, 2277b.
 Massenet, Jules Emile, 2277b.
 Massillon, Ohio, 2277b.
 Massive, Mount, 885b.
 Master's Degree, 2278a.
 Mastersingers, 2278a.
 Mastication, 2278a.
 Mastiff, 1089b.
 Mastiff, 2278a.
 Mastodon, 2278b.
 Matabele, 2278b.
 Matador, 598b.

Matanzas, Cuba, 2279a.
 Matches, 139b, 1823a, 2279a.
 Mate, 2279b.
 Mate (officer), 2279b.
 Material, Strength of, 3450a.
 Materialism, 2279b.
 Materia Medica, 2280a.
 Mathematical Geography, 1461b.
 Mathematics, 2280a.
 Mather, Cotton, 2281a, 3902b.
 Mather, Increase, 2281a.
 Matrix, 3661b.
 Matter, 2281a.
 Matterhorn, 2281b.
 Matthew, Saint, 2281b.
 Matthews, James Brander, 2281b.
 Mattoon, Ill., 2282a.
 Maumee River, 2282a.
 Mauna Kea, 1643b, 2282a, 3618a.
 Mauna Loa, 1643b, 2282a, 3618a.
 Maupassant, Henri Rene Albert Guy de, 2282a.
 Mauretania, 3283a.
 Mauritius Island, 2282b.
 Mausoleum, 2282b, 3592b.
 Mausolus, 2282b.
 Maxim (family), 3282b.
 Maximilian, 2283a, 2473b.
 Maximilian of Baden, 1502a.
 Maxwell, William Henry, 2283a.
 May, 2283a.
 Maya, 2284a.
 May Apple, 2236a, 2284a.
 May Beetle, 1917a.
 May Day, 2283b.
 Mayflower (vessel), 553a, 2284a, 2875b, 2876a, 3358a, 3403a.
 May Fly, 2284b.
 Mayhem, 2284b.
 Mayo, Charles Horace, 2284b.
 Mayo, Henry T., 3714b, 3884b.
 Mayo, William James, 2284b.
 Mayor, 2285a, 2434a.
 Maypop, 2754b.
 Mazarin, Jules, 2285a.
 Mazeppa, Ivan Stefanovitch, 2285b.
 Mazzini, Giuseppe, 2285b.
 McAdoo, William Gibbs, 2196a, 3001b.
 McAlester, Okla., 2196b.
 McBride, Richard, 2198a.
 McClellan, George Brinton, 2198b.
 McCarthy, Justin, 2198b.
 McClure, Samuel Sidney, 2199a.
 McCormack, John, 2199a.
 McCormick, C. H., 1823a, 2199a.
 McCrae, John, 2199a.
 McCutcheon, George Barr, 2199b.
 McCutcheon, John Tinney, 2200a.
 McDonough, Commodore, 3805b.
 McGee, Thomas D'Arcy, 2201b.
 McGill College and University, 2202a.
 McKeesport, Pa., 2203b.
 McKinley, Mount, 2205a.
 McKinley, William, 2205b, 2584a.
 McMaster, John Bach, 2208b.
 McMonnies, Frederick, 2208b, 3236a.
 Meade, George Gordon, 2286a.
 Meadow Lark, 2060b, 2286b.
 Meadowsweet, 3386b.
 Meadville, Pa., 2286b.
 Mealy Bug, 2286b.
 Measles, 784a, 2286b.
 Measures and Weights, 3843a.
 Measuring Worm, 2287a.
 Meat, 1098a, 2287a.
 Meat Packing, 2288a.

Mecca, Hedjaz, 2289b.
 Mechanical Engineer, 1225b.
 Mechanical Powers, 2289b, 2290a.
 Mechanics, 2289b.
 Mechanicsville, Battle of, 2290a.
 Mechlin, Belgium, 2230a.
 Medial Moraine, 2410a.
 Mecklenburg Declaration of Independence, 2290a.
 Mecklenburg-Schwerin, 2290b.
 Medea, 2290b.
 Medford, Ore., 2290b.
 Medical Schools, 2290b.
 Medici, 2291a.
 Medici, Maria de, 1672b.
 Medicine, 2291a.
 Medicine Hat, Alberta, 2292a.
 Medicine Man, 3271a.
 Medieval and Modern History, 1694b.
 Medina, Hedjaz, 2292a.
 Mediterranean Sea, 2292b.
 Medulla Oblongata, 541b, 2292b.
 Medusa, 2293a, 2792a.
 Meerscham, 2293a, 2857b.
 Megaphone, 2293a.
 Mehemet Ali, 1191a.
 Mehemet Shah, 2795b.
 Mehmet, 2375b.
 Meighen, Arthur, 2293a.
 Meissonier, Jean Louis Ernest, 2293b.
 Meistersingers, 2278a.
 Mekong River, 2293b.
 Melancholia, 1805b.
 Melanchthon, Philip, 2293b, 3040b.
 Melanesia, 2632a.
 Melba, Nellie, 2293b.
 Melbourne, Australia, 2294a.
 Mellon, Andrew W., 2294a.
 Melbourne, William L., 2294a.
 Melchior, 2217b.
 Melilot, 2294a.
 Melodeon, 2678a.
 Melodrama, 2294b.
 Melon, 2294b.
 Melon Eaters, The, 2707a.
 Melon Tree, 2220b.
 Melos, 2294b.
 Melpomene, 2294b, 2438b.
 Melting Point, 2294b.
 Membranes, 2295a.
 Memling, Hans, 2295a, 2705a.
 Mennon, 2295a.
 Memorial Day, 2295b.
 Memorizing, Selections for, 2124a.
 Memory, 2295b.
 Memory, 2958b, 2962a.
 Memory Poems, 2026a.
 Memory Work, 2018a.
 Memphis, Egypt, 2297a.
 Memphis, Tenn., 2297a.
 Memphremagog, Lake, 2297b.
 Men, Races of, 2994a.
 Mendelssohn-Bartholdy, Felix, 2297b.
 Mendicant Orders, 2297b.
 Mendoza, Argentina, 2298a.
 Menelaus, 2298a, 2458a.
 Menelek II, 10b.
 Menephtah, 1190b.
 Menhaden, 2298a.
 Meningitis, 2298a.
 Mennonites, The, 2298b.
 Menominee, Mich., 2298b.
 Menominee Indians, 2298b.
 Menstruum, 3343b.
 Mensuration, 2298b.
 Mental Activity, Phases of, 2958b.
 Mental Attitudes, 1262a.
 Mental Defectives, 1305b.
 Mental Powers, Development of the, 2767a, 2959b.
 Mentor, 2303a.

Mephistopheles, 2303a.
 Mercantile Agency, 899a.
 Mercator's Projection, 2247b.
 Mercerized Cotton, 29a.
 Mercerizing, 2303b.
 Merchant Marine, 2303b.
 Merchant of Venice, 2304b.
 Mercier, Honore, 2304b.
 Mercury (metal), 344a, 767b, 2304b, 3563b.
 Mercury (mythology), 2305a, 2455b.
 Mercury (planet), 2305a.
 Mercury, Bichloride of, 965b.
 Mercy, Sisters of, 2305b.
 Mer de Glace, 103a, 1516a, 2305b.
 Meredith, George, 2306a.
 Merganser, 2306a.
 Mergenthaler, Ottmar, 2117a.
 Merida, Mexico, 2306a.
 Meriden, Conn., 2306a.
 Meridian, 2306b.
 Meridian, Miss, 2306b.
 Merimee, Prosper, 2306b.
 Merlin, 2306b.
 Mermaid and Merman, 2307a.
 Merope, 2872b.
 Merovingians, 2307a.
 Merrimac (ship), 838a.
 Merrimac River, 2307a.
 Mersey River, 2307a.
 Merthyr-Tydfil, Wales, 2307a.
 Merv, Oasis of, 2307b.
 Mesa, 2307b.
 Mesa Verde National Park, 2742b.
 Mesmer, Friedrich Anton, 2307b.
 Mesmerism, 2307b.
 Mesopotamia, 2308a.
 Mesozoic Era, 2308a.
 Mesquite, 2308a.
 Messina, 2308a.
 Messiah, 2308a.
 Messiah, The, 1623b.
 Messina, Sicily, 2308b.
 Messina, Strait of, 2308b.
 Messines, Ridge, 3925a.
 Mestizos, 491a, 2319a, 2798a, 3748b.
 Meta (comet), 1982b.
 Metacarpals, 1623a.
 Metacarpus, 3318b.
 Metalloids, 2309b.
 Metallurgy, 2308b.
 Metals, 2309b.
 Metamorphic Rocks, 1474b, 2310a.
 Metamorphism, 2310a.
 Metamorphosis, 2310a.
 Metaphor, 1321a, 2310b.
 Metaphysics, 2310b.
 Metatarsus, 1368a, 3319a.
 Metaurus, Battle of, 1319b.
 Metempsychosis, 3608b.
 Meteor, 2310b.
 Meteorology, 2311a.
 Meter (unit measure), 2311b, 2315a.
 Meter (verse), 2311b.
 Methane, 2311b.
 Methodist Episcopal Church, 2312a, 3848b.
 Methodist Protestant Church, 2312a.
 Methodists, 2312a.
 Methods of Teaching, 2312b.
 Methyl Alcohol, 3907a.
 Methylated Spirit, 2314a.
 Metis, 2241a, 3200a.
 Metonymy, 2314b.
 Metric System, 2314b.
 Metronome, 2316a.
 Metropolitan Museum of Art, 2316b.
 Metternich, Clemens Wenzel, 2316b.
 Metz, Lorraine, France, 2317a.
 Meuse River, 2317a.

- Meyerbeer, Giacoma, 2317a.
 Mexican War, The, 2317b, 3709b.
 Mexico, 2319a.
 Mexico, Gulf of, 2323b.
 Mexico City, 2323b.
 Mezzo-Rilievo, 1219b, 2324a.
 Mezzotint, 2324a.
 Miami, Fla., 2324a.
 Mica, 2324a.
 Mica Schist, 2324b.
 Michael, Saint, 2324b.
 Michaelmas, 2324b.
 Michelangelo Buonarroti, 2324b, 2704b.
 Michelet, Jules, 2325a.
 Michelson, Albert Abraham, 2325b, 2577b.
 Michigan, 2325b.
 Michigan, Lake, 2331a.
 Michigan, University of, 2331b.
 Michigan City, Ind., 2331b.
 Microbe, 314a.
 Microcline, 1307b.
 Micrococcus, 314a.
 Micrometer, 2332a.
 Micronesia, 2332a, 2632a.
 Microscope, 2332a.
 Midas, 2332a.
 Middle Ages, 2333a.
 Middletown, Conn., 2333a.
 Middletown, N. Y., 2333a.
 Middletown, Ohio, 2333b.
 Middlings, 3859a.
 Midianites, 2333b.
 Midland, Ont., 2333b.
 Midrash, 1660b.
 Midshipman, 2333b.
 Midsummer Night's Dream, 2333b.
 Mignonette, 2333b.
 Migration of Animals, 2334a.
 Migration of Birds, 456b, 457a, 457b.
 Mikado (title), 1877a, 2334b.
 Mikado, The, 1511a, 3467a.
 Milan, Italy, 2334b.
 Milan Decree, 2335b.
 Mildews, 2335b.
 Mile, 2335b.
 Miles, Nelson Appleton, 2336a.
 Miles City, Mont., 2336a.
 Miletus, 2336a.
 Military Academy, United States, 2336a.
 Military Insignia, 1810b.
 Military Schools, 2337a.
 Military Training in High Schools is Desirable (theme), 3560b.
 Militia, 224a, 2477b.
 Milk, 2337a, 2491a.
 Milk, Condensed, 2339a.
 Milking Machine, 2339b.
 Milk Snake, 2339b.
 Milkweed, 2339b.
 Milky Way, 2340a.
 Mill, James, 2340a.
 Mill, John Stuart, 2340a, 3729a.
 Millais, John Everett, 2340b.
 Millboard, 703a.
 Millenium, 2340b.
 Miller, Cincinnatus Heine, 2340b.
 Miller, William, 29a.
 Miller's Thumb, 3229a.
 Millet, 2341a.
 Millet, Jean Francois, 2341a, 2707b.
 Mill on the Floss, 1213b.
 Millville, N. J., 2341b.
 Milner, Alfred, 2341b.
 Milo, 2294b.
 Milreis, 2341b.
 Miltiades, 2342a.
 Milton, John, 2342a.
 Milwaukee, Wis., 2343a.
 Milyukof, Paul, 3145a.
 Mimeograph, 944b.
 Mimicry, 2951a.
 Mina Bird, 1544a.
 Minaret, 2344a.
 Minas Bay, 2344a, 3505a.
 Mind, 2344a.
 Mindanao, 2815b.
 Mind and Body, Relation of, 2767a.
 Mind Reading, 2344b.
 Mineral Pitch, 463a.
 Minerals and Mineralogy, 2344b.
 Mineral Springs, 3391b.
 Mineral Waters, 2345a.
 Minerva, 2345b.
 Mine Sweeping, 3457a.
 Minimum Wage, 2345b.
 Mining, 2346a.
 Minister Plenipotentiary, 1245a.
 Minister Resident, 2347a.
 Ministry, 1560a, 2347a.
 Mink, 2347a.
 Minneapolis, Minn., 2347a.
 Minnehaha, 2349a.
 Minnesingers, 2349a.
 Minnesota, 2349a.
 Minnesota, University of, 2354b.
 Minnesota River, 2355a.
 Minnow, 2355a.
 Minor, 2355a.
 Minorca Island, 2355b.
 Minor Coins, 2385a.
 Minor Prophets, The, 2355b.
 Minos, 2355b.
 Minotaur, 2355b, 3565a.
 Minsk, Russia, 2355b.
 Minstrel, 2355b.
 Mint, 2356a.
 Mint (plant), 2356b.
 Minto, Gilbert John Murray, 2356b.
 Minuet, 1025a, 2356b.
 Minuit, Peter, 2357b, 2560a.
 Minute, 2357a.
 Minutemen, 2357a.
 Miocene Period, 2357a.
 Mirabeau, Gabriel Honore Riquetti, 2357a.
 Miracle, 2357b.
 Miracle Play, 2357b.
 Mirage, 1468b, 2357b.
 Miramichi River, 2358a.
 Mirror, 2358a.
 Misdemeanor, 2359a.
 Misery, Mount, 3620b.
 Misfeasance, 2230a.
 Mishawaka, Ind., 2359a.
 Mishna, 1660b, 3508a.
 Missal, 2359a.
 Missions and Missionaries, 2359a.
 Mississippi, 2360a.
 Mississippi, University of, 2364a.
 Mississippi River, 2364a.
 Mississippi Scheme, 2365b.
 Missoula, Mont., 2365b.
 Missouri, 2366a.
 Missouri, University of, 2371a.
 Missouri Compromise, 2371a.
 Missouri Indians, 2371a.
 Missouri-Mississippi System, 2365b.
 Missouri River, 2371b.
 Mist, 1366a.
 Mistletoe, 520b, 2371b.
 Mitchell, Donald Grant, 2372a.
 Mitchell, John, 2372a.
 Mitchell, Silas Weir, 2372b.
 Mitchell, S. D., 2372b.
 Mites, 2372b.
 Mithridates, 2373a.
 Mittel Europa, 3919b.
 Mizpah, 2372a.
 Moabites, 2373b.
 Moabite Stone, 2373b.
 Moberly, Mo., 2373b.
 Mobile, Ala., 2373b.
 Mobile Bay, Battle of, 2374a.
 Mobile River, 2374b.
 Moccasin Flower, 2004b.
 Moccasin Snake, 2374b.
 Mocking Bird, 2374b.
 Modjeska, Helena, 2374b.
 Modoc, 2375a.
 Mogul, 2375a.
 Mohair, 2375a.
 Mohammed, 155b, 2375a.
 Mohammed Ali, 2796a.
 Mohammed II, 622b.
 Mohammed V, 2375b, 3653a.
 Mohammed VI, 3653b.
 Mohammedan Architecture, 2375b.
 Mohammedanism, 2376a.
 Mohave Indians, 2376b.
 Mohawk Indians, 2378a.
 Mohawk River, 2378a.
 Mohegan Indians, 2378a.
 Mohican Indians, 2378a.
 Moki Indians, 1717b.
 Molars, 3527a.
 Molasses, 2378a.
 Mold, 2378b.
 Moldings, 2378b.
 Mole, 2378b.
 Mole Cricket, 2379a.
 Molecular Forces, 2379b.
 Molecular Weights, 2379b.
 Molecule, 2379a.
 Moliere, Baptiste Poquelin, 2379b.
 Moline, Ill., 2380a.
 Mollusca, 2380a.
 Molokai, 2380b.
 Molting, 1303b, 2380b.
 Moltke (family), 2381a.
 Moluccas, The, 2381b.
 Momentum, 2381b.
 Mommsen, Theodor, 2381b.
 Momus, 2382a.
 Monachism, 2382b.
 Monaco, Principality of, 2382a.
 Mona Lisa, 2704a, 3774a.
 Monarchy, 1542a, 2382a.
 Monasticism, 2382b.
 Monastir, Serbia, 2383b.
 Monck, Charles Stanley, 2383b.
 Monck, George, 2388a.
 Moneywort, 2194b.
 Moncton, N. B., 2383b.
 Monday, 2383b.
 Money, 2384a.
 Money, in Canada, 2386a.
 Money Order, 2386b.
 Mongolia, 2387a.
 Mongols, 2387a, 2994b.
 Mongoose, 1757a, 2387b.
 Monitor (animal), 2387b.
 Monitor and Merrimac, 838a, 2388a.
 Monk, 2382b.
 Monk, George, 2388a.
 Monkey, 2388b.
 Monk's-hood, 14b.
 Monmouth, Battle of, 2389a.
 Monmouth, Ill., 2389a.
 Monmouth, James, 2389a.
 Monobasic Acid, 14a.
 Monocotyledons, 517a, 518b, 972b.
 Monogamy, 2257a.
 Monomania, 2389b.
 Monongahela River, 2389b.
 Monoplane, 1363a.
 Monopoly, 2389b.
 Monorail, Suspended, 2390a.
 Monotheism, 2390a.
 Monotype, 2390a.
 Monroe Doctrine, 2395a.
 Monroe, James, 2390b.
 Monroe, La., 2394b.
 Monrovia, Liberia, 2395b.
 Monsoon, 2396a.
 Monsoon Current, 2630b.
 Monstrosity, 2396a.
 Montaigne, Michel Eyquem de, 2396a.
 Montana, 2396b.

Montana, University of, 2400a.
 Mont Blanc, 2400a.
 Montcalm de Saint-Veran, Louis Joseph, 2400a.
 Mont Ceniz Tunnel, 736b.
 Monte Carlo, 2382a.
 Monte Cristo, 2400b.
 Montenegro, 2400b.
 Monterey, Battle of, 2401a.
 Monterey, Mex., 2401a.
 Monte Rosa, 2401a.
 Montessori, Maria, 2401a.
 Montessori Method, 2401b.
 Montevideo, Uruguay, 2403b.
 Montezuma, 967a, 2403b.
 Montfort, Simon de, 2404a.
 Montgomery, Ala., 2404a.
 Month, 2404b.
 Monticello, 1885a, 2404b.
 Montmorency, Falls of, 2986a.
 Montpelier, Vt., 2405a.
 Montreal, Que., 2405a.
 Moody, Dwight Lyman, 2406b.
 Moon, 266b, 2407a.
 Moon and Morning Stars (game), 1440a.
 Moonflower, 2408a.
 Moonshiners, 2408a.
 Moonstone, 461a, 1307b, 2408b.
 Moore, John, 2408b.
 Moore, Thomas, 2408b.
 Moors, 2409a, 2917a.
 Moose, 2409a.
 Moosehead Lake, 2409b.
 Moose Jaw, Sask., 2409b.
 Moraine, 1516a, 2410a.
 Moral Acts, 1259b.
 Morality Plays, 1115a, 2410a.
 Morals Court, 2410a.
 Moral Standards, 1261b.
 Moral Training, 1258a.
 Moratorium, 2410b.
 Moravia, 2410b.
 Moravian Brethren, 2410b.
 Mordants, 1158b, 2411a.
 Mordecai, 424a.
 More, Thomas, 2411a.
 Morelia, Mexico, 2411b.
 Morgan, Daniel, 2411b.
 Morgan, Henry, 2411b.
 Morgan, John Pierpont, 2412a.
 Morgantic Marriage, 2257a.
 Morgantown, W. Va., 2412b.
 Morley, John, 2412b.
 Mormons, 2413a, 3327b.
 Mormon Temple, 3177b.
 Morning-Glory, 2414a.
 Morocco (capital of sultanate), 2414b.
 Morocco (leather), 2415a.
 Morocco (sultanate), 2414a.
 Morpheus, 2415a.
 Morphine, 139b, 2415a.
 Morphology, 2415b.
 Morrill, Justin Smith, 2415b.
 Morris, Arthur J., 2416b.
 Morris, Gouverneur (statesman), 2415b.
 Morris, Gouverneur (writer), 2416a.
 Morris, Robert, 2416a.
 Morris, William, 2416a.
 Morris Plan Banks, 2416b.
 Morristown, N. J., 2416b.
 Morse, Samuel Finley Breese, 1823a, 2417a, 3530b.
 Mortality, Law of, 2417b.
 Mortar, 2417b.
 Mortar (weapon), 2417b.
 Morte D'Arthur, 2418a.
 Mortgage, 2418a.
 Mortgage Bonds, 497b.
 Morton, Julius Sterling, 2419a, 2498b.
 Morton, Levi Parsons, 2419b.
 Morton, William Thomas, 2419b.
 Mosaic, 2419b, 3582b.
 Moscow, Idaho, 2420a.
 Moscow, Russia, 2420a.

Moselle River, 2421a.
 Moses, 410a, 2421a.
 Mosi-oa-tuni, 3770a.
 Mosque, 2421a.
 Mosque of Omar, 1889a, 3537b.
 Mosquito, 2421a.
 Mosquito Territory, 2422b.
 Mossbunker, 2298a.
 Mosses, 2422b.
 Mosses from an Old Manse, 1647a.
 Moszkowski, Moritz, 2423a.
 Moth, 2423a.
 Mother Carey's Chickens, 2804b.
 Mother Goose, 2018a, 2423b.
 Mother-of-Pearl, 2424a, 2764b.
 Mother of Presidents, 3776b.
 Mother's Day, 2424a.
 Mother Shipton, 2424a.
 Mother's Pensions, 2424b.
 Motion, Laws of, 1159a.
 Motions, Classification, 2748b.
 Motley, John Lothrop, 2424b.
 Motor Boat, 2424b.
 Motorcycle, 2425a.
 Motor Nerves, 2508b.
 Mott, Lucretia Coffin, 2425b, 3905b.
 Moukden, 2431a.
 Moultrie, William, 2425b.
 Mound Bird, 2425b.
 Mound Builders, 2426a.
 Mountain, 1468a, 2426b.
 Mountain Ash, 2427a.
 Mountain Crabs, 2011b.
 Mountain Laurel, 1923b.
 Mountain-leather, 239b.
 Mountain Lion, 2969a.
 Mountain-wood, 239b.
 Mount Carmel, Pa., 2427a.
 Mount Desert Island, 2427a.
 Mount McKinley National Park, 2742b.
 Mount of Olives, 2654b.
 Mount Rainier National Park, 2742b.
 Mounts (palmistry), 2716a.
 Mount Stephen, Lord, 2427a.
 Mount Vernon, Ill., 2427b.
 Mount Vernon, N. Y., 2427b.
 Mount Vernon, Ohio, 2428a.
 Mount Vernon, Va., 2427b.
 Mourning, 2428a.
 Mourning Dove, 2851b.
 Mouse, 2428a.
 Mouth, The, 2428a.
 Moving Pictures, 2428b.
 Moving Picture Theatre, 3557a.
 Mozambique, 2918b.
 Mozambique Channel, 2430a.
 Mozambique Current, 2630a.
 Mozart, Johann, 2430a.
 Mucilage, 2430b.
 Mucus, 2430b.
 Mud Hen, 941b.
 Mud Turtle, 3655b.
 Muezzin, 2430b.
 Mugwump, 2430b.
 Muir, John, 2430b.
 Muir Glacier, 2431a.
 Mukden, Battle of, 3146b.
 Mukden, Manchuria, 2431a.
 Mulatto, 2431b, 2977a.
 Mulberry, 2431b, 3303b.
 Mule, 253a, 2432a.
 Mule Killer, 3797b.
 Mullein, 2432a.
 Mullens, Priscilla, 976b, 2432a.
 Muller, Friedrich Max, 2432a.
 Mullet, 2432b.
 Multigraph, 945a.
 Multiples, Game of, 186b.
 Multiplex Telegraph, 3530a.
 Mummy, 2432b.
 Mumps, 785a, 1519a, 2433a.
 Muncie, Ind., 2433a.
 Mundelein, George W., 2433a.
 Mongoose, 2387b.
 Munich, Germany, 2433b.

Municipal Government, 2433b.
 Municipal Ownership, 2434b.
 Munkacsy, Mihaly, 2434b.
 Munroe, Kirk, 2434b.
 Munsee Indians, 2435a.
 Munsey, Frank Andrew, 2435a.
 Murat, Joachim, 2435a.
 Muratore, Lucien, 2435b.
 Murcia, Spain, 2435b.
 Murder, 2435b.
 Murfree, Mary Noailles, 2436a.
 Murfreesboro, Battle of, 2436a.
 Muriatic Acid, 1745b.
 Murillo, Bartolome Esteban, 2436a.
 Murray, Lindley, 2436b.
 Murray Canal, 679a.
 Murray River, 289a, 2436b, 3358a, 3769a.
 Murrumbidgee River, 2437a.
 Muscat, Oman, 2437a.
 Muscatine, Iowa, 2437a.
 Muscle, 2437a, 2842a.
 Muscle Reading, 2344b.
 Muscular Sense, 2437a, 2438a.
 Muscular Tissue, 2437a.
 Muses, 2438a.
 Museum, 2438b.
 Mushrooms, 520b, 2439a.
 Music, 2439b.
 Musical Drama, 2664a.
 Musk, 2443b.
 Muskegon, Mich., 2443b.
 Muskellunge, 2443b.
 Muskhogean Indians, 2443b.
 Muskmelon, 2444a.
 Muskogee, Okla., 2444a.
 Muskoka Lake, 2444a.
 Musk Ox, 2444b.
 Muskrat, 2444b.
 Muslin, 2445a.
 Mussel, 2445a.
 Musset, Alfred de, 2445a.
 Mussolini, Benito, 2445a.
 Must, 3892b.
 Mustard, 2445b.
 Mustard Gas, 2881b.
 Mutiny, 2445b.
 Mutiny Act, 2445b.
 Mutsuhito, 2446a.
 Mutton, 2446a.
 Muzaffar-ed-Din, 2795b.
 Mycenae, 2446a.
 Myopia, 2446b.
 Myriapoda, 2446b.
 Myron, 1079b.
 Myrrh, 2446b.
 Myrtle, 2446b.
 Mysore, India, 2447a.
 Mysteries, 2447a.
 Mystery, 2447a.
 Mystery of Edwin Drood, 1072b.
 Mystery Plays, 1115a.
 Mysticism, 2447b.
 Mythology, 1478a, 2447b.
 My Thought (game), 1442a.
 Myxothallophytes, 516b.

N

N, 2466a.
 Naaman, 420a.
 Nabopolassar, 257a, 310b.
 Nacre, 2424a, 2764b.
 Nadir, 2466a.
 Nagana, 3642a.
 Nagasaki, Japan, 2466a.
 Nagoya, Japan, 2466a.
 Naiads, 2466b, 2625b.
 Nails (metal), 2466b.
 Nails (of animals), 2466b.
 Naismith, James, 356a.
 Names, Personal, 2467a.
 Namur, Belgium, 2467b.
 Nanaimo, B. C., 2468a.
 Nana Sahib, 1784a, 2468a.
 Nancy, France, 2468a.
 Nandu, 3058b.

Nanking, China, 2468a.
 Nansen, Fridtjof, 2468b.
 Nantes, Edict of, 2469a.
 Nantes, France, 2469a.
 Nanticoke, Pa., 2469b.
 Nantucket Island, 2469b.
 Naomi, 414a.
 Naples, Bay of, 2470a.
 Naples, Italy, 2469b.
 Naples, University of, 2470a.
 Napoleon I, 2470b, 3161b.
 Napoleon II, 3043b.
 Napoleon III, 2473a.
 Naptha, 2473b.
 Narcissus (mythology), 2474a.
 Narcissus (plant), 2474a.
 Narcotic, 2474b.
 Nard, 3385a.
 Narragansett Bay, 2474b.
 Narragansett Indians, 2474b.
 Narvaez, Panfilo de, 2474b.
 Narwhal, 2474b.
 Naseby, Battle of, 2475a.
 Nashua, N. H., 2475a.
 Nashville, Battle of, 2475a.
 Nashville, Tenn, 2475b.
 Nasmyth, James, 2476a, 3415b.
 Nasmyth Hammer, 3415b.
 Nast, Thomas, 2476a.
 Nasturtium, 2476a.
 Natal, 2476b.
 Natchez, Miss., 2476b.
 Natick, Mass, 2477a.
 National Academy of Design, 2477a.
 National Academy of Sciences, 2477a.
 National Bank, 334a.
 National Bank Notes, 2386a.
 National Civic Federation, 2477a.
 National Congress of Mothers, 2734b.
 National Debt, 2477b.
 National Education Association, 1183a.
 National Flowers, 1355b.
 National Guard, 2477b.
 National Hymns, 1749b.
 Nationalists, 2886b.
 National Museum of the United States, 2478b.
 National Republican Party, 2890a.
 National Road, 1007b.
 National Roads, 3083a.
 National Transcontinental Railway, 3003a.
 National Zoological Park, 3814a.
 Nations, Law of, 1820b.
 Nations, League of, 2478b.
 Nations, Naming the, 1243a.
 Native Bear, 1992a.
 Nat Turner Insurrection, 3654b.
 Natural (music), 2484a.
 Natural Bridge, 2484a.
 Natural Gas, 1452b, 3678a.
 Natural History, 2484a.
 Naturalism, 2484a.
 Naturalization, 2484b.
 Naturalization (botany), 12a.
 Natural Monopoly, 2390a.
 Natural Selection, 2485b.
 Natural Theology, 2485b.
 Nature Study, 2486a.
 Nature Worship, 2492a.
 Nausea, 2492b.
 Nautical Almanac and American Ephemeris, 100b.
 Nautilus, 2492b.
 Navaho Indians, 2492b.
 Naval Academy, United States, 2492b.
 Naval Arsenals, 232b.
 Naval Cadet, 2333b.
 Naval Militia, 2493b.
 Naval Observatory, 2493b.

Naval Reserve, 2494a.
 Naval Training Station, Great Lakes, 2494a.
 Naval Uniforms, 3668a.
 Navarre, 2494b.
 Nave, 2494b.
 Navigation, 2494b.
 Navigation Acts, 2495a.
 Navy, 2495b.
 Navy, Department of the, 2497b.
 Navy Yards, 232b, 1088a.
 Nazarenes, 2497b.
 Nazareth, 2497b.
 Nazimova, Alla, 2497b.
 Nebo, Mount, 2498a.
 Nebraska, 2498a.
 Nebraska, University of, 2502a.
 Nebuchadnezzar, 310a, 421a, 2502a.
 Nebula, 2502a.
 Nebular Hypothesis, 1167b, 1477a, 2502a.
 Necker, Jacques, 2502b.
 Necromancy, 2502b.
 Necropolis, 2503a.
 Nectar, 2503a.
 Nectarine, 2503a.
 Needle, 2503a.
 Negaunee, Mich., 2503b.
 Negligence, 2503b.
 Negotiable Paper, 2503b.
 Negritos, 2504a.
 Negro, 2504a, 2994b.
 Negus, 10b, 2504b.
 Nehemiah, 2504b.
 Neighborhood Center, 902b.
 Nelson, B. C., 2504b.
 Nelson, Horatio, 2504b, 3621a.
 Nelson River, 2505a.
 Nelumbo, 2505a.
 Nemean Games, 2505b.
 Nemesis, 2505b.
 Neocene Epoch, 2505b.
 Nepal, Kingdom of, 2505b.
 Nephrite, 1867a, 2506a.
 Nephritis, 2506a.
 Nepigon Lake, 2575b.
 Nepissing Lake, 2575b.
 Nepos, Cornelius, 2506a.
 Neptune (mythology), 2506a.
 Neptune (planet), 2506b.
 Nereids, 2506b, 2625b.
 Nereus, 2506b.
 Nernst Lamp, 1203b.
 Nero, 2507a.
 Nerva, 2507a.
 Nerves, 2507a.
 Nervous Diseases, 2508a.
 Nervous System, 2508a.
 Nest, 2511a.
 Nestor, 2458a, 2512a.
 Net, 2512a.
 Netherlands, The, 2512b.
 Nettle, 2517a.
 Nettle Tree, 2517a.
 Neuchatel, Lake of, 2517a.
 Neuchatel, Switzerland, 2517a.
 Neuralgia, 2507b, 2517b.
 Neurasthenia, 2517b.
 Neuritis, 2518a.
 Neurones, 2507b, 2963a.
 Neuroptera, 2518a.
 Neurosis, 2518a.
 Neurotic, 2518a.
 Neutrality, 2518a.
 Neva, 2518b.
 Nevada, 2519a.
 Nevada State University, 2521b.
 Nevin, Ethelbert, 2521b.
 New Albany, Ind., 2521b.
 Newark, N. J., 2522a.
 Newark, Ohio, 2522b.
 New Bedford, Mass., 2522b.
 Newbern, N. C., 2523a.
 New Britain, Conn., 2523a.
 New Brunswick, 2523a.
 New Brunswick, N. J., 2525b.

Newburgh, N. Y., 2526a.
 Newburyport, Mass., 2526a.
 New Caledonia, 2526b.
 Newcastle, Ind., 2526b.
 Newcastle, New South Wales, 2526b.
 Newcastle, Pa., 2526b.
 Newcastle-upon-Tyne, England, 2527a.
 Newcomb, Simon, 2527a.
 New England Confederation, 2527b.
 Newfoundland, Dominion of, 2527b.
 Newfoundland Dog, 2528b.
 New Glasgow, N. S., 2529a.
 New Guinea, 2529a.
 New Hampshire, 2529b.
 New Haven, Conn., 2533a.
 New Hebrides, 2533b.
 New Jersey, 2534a.
 New London, Conn., 2537b.
 Newman, John Henry, 2537b, 2694b.
 New Mexico, 2538a.
 New Mexico, University of, 2542a.
 New Moon, 2407b.
 New Orleans, Battle of, 2543b.
 New Orleans, La., 2542a.
 Newport, Ky., 2544a.
 Newport, R. I., 2544b.
 Newport News, Va., 2544b.
 New Red Sandstone, 2545a.
 New Rochelle, N. Y., 2545a.
 New South Wales, 2545a.
 Newspaper, 2546b.
 Newspaper Press, 2943a.
 Newt, 2547b.
 New Thought, 2547b.
 Newton, Isaac, 2547b.
 New Westminster, B. C., 2548a.
 New Year's Day, 1871b, 2548a.
 New York (city), 2555a.
 New York (state), 2548b.
 New York, College of the City of, 2561a.
 New York, University of the State of, 2552a.
 New York State Barge Canal, 1251a, 2561b.
 New York University, 2562a.
 New Zealand, Dominion of, 2562b.
 Ney, Michel, 2564b.
 Nez Perce, 2565a.
 Niagara Falls, N. Y., 2565a.
 Niagara Falls, Ont., 2565b.
 Niagara Falls and River, 2565b.
 Niagara Suspension Bridge, 3090b.
 Nibelungenlied, 2567a.
 Nicaragua, 2567b.
 Nicaragua, Lake, 2568a.
 Nicaragua Canal, 2568b.
 Nice, Councils of, 2569a.
 Nice, France, 2569a.
 Nicene Creed, 984b, 2569a.
 Nicholas (Serbia), 2400b.
 Nicholas, Saint, 2570a.
 Nicholas I, 3143a.
 Nicholas I Pavlovitch, 2569a.
 Nicholas II, 2569b, 3095a, 3143a.
 Nicholas Nickleby, 1072a.
 Nicholson, Meredith, 2570a.
 Nicias, 2570b.
 Nickel, 2570b.
 Nickel Silver, 1492a, 2570b.
 Nicobar Islands, 2570b.
 Nicolet, Jean, 3900a.
 Nicotine, 139b, 2571a, 3587b.
 Nielson, Alice, 2571a.
 Niemen River, 2571a.
 Nietzsche, Frederick, 2571a.
 Niflheim, 2571b.
 Niger River, 2571b.
 Nigeria, 2572a.

Nigger-toe, 547b.
 Night, 1466a.
 Night-blooming Cereus, 741a.
 Night Hawk, 2572a.
 Night Heron, 2572a.
 Nightingale, 2572b.
 Nightingale, Florence, 2572b.
 Nightjar, 1527a.
 Nightmare, 2573a.
 Night School, 1280a.
 Nightshade, 2573a.
 Nightshade Family, 523a.
 Night Watch, The, 3046b.
 Nihilists, 2573a.
 Nijni-Novgorod, Russia, 2577a.
 Nikalgen, 123b.
 Nike Apteros, Temple of, 2573b.
 Nike of Samothrace, 3233a, 3893a.
 Nile, 2573b.
 Nilsson, Christine, 2574b.
 Nimbus, 2574b.
 Nimes, France, 2574b.
 Nimrod, 2575a.
 Nine Days' Queen, 1584b.
 Nineveh, 2575a.
 Ning-po, China, 2575a.
 Niobe, 2575a.
 Niobe and Her Children, 3233a.
 Nipigon, Lake, 2575b.
 Nipissing, Lake, 2575b.
 Nippon, 2575b.
 Nirvana, 588b.
 Nisan, 2575b.
 Nish, Serbia, 2575b.
 Nismes, France, 2574b.
 Nitrate of Silver, 3308b.
 Nitrates, 2576a.
 Nitre, 3178b.
 Nitric Acid, 2576a.
 Nitrogen, 2576b.
 Nitroglycerine, 2576b.
 Nitrous Oxide, 1059b.
 Nix, 2577a.
 Nixies, 1294a.
 Nizam's Dominions, 1743b.
 Nizhni-Novgorod, Russia, 2577a.
 Noah, 2577a.
 Nobel, Alfred Bernard, 2577b.
 Nobel Prizes, 2577b.
 Nobility, 2577b.
 Noble Metal, 767b.
 Nocturne, 2578a.
 Node, 2578a.
 Nogi, Ki-teu, 2578a.
 Nomad Life, 2578b.
 Nome, Alaska, 2578b.
 Nomen, 2467a.
 Noncommissioned Officers, 227b, 2578b.
 Nonconductors, 1201b.
 Nonconformists, 2579a.
 Nones, 2579a.
 Non-Intercourse Act, 1218b.
 Non-Metals, 2309b.
 Non-Moral Acts, 1260a.
 Nonnezoshi Bridge, 3726a.
 Non-Partisan League, 2579a.
 Nonsense Verses, 2022a.
 Nordau, Max Simon, 2579a.
 Nordenskjold, Nils Adolph Erik, 2579b.
 Nordica, Lillian, 2579b.
 Norfolk, Va., 2579b.
 Noria, 2796b.
 Normal School, 2580a.
 Norman Architecture, 2580b.
 Norman Conquest, 3875b.
 Normandy, 2581a.
 Normans, 2581a.
 Norns, 2581a.
 Norristown, Pa., 2581b.
 Norsemen, 2603a.
 Norse Mythology, 2463a.
 North, Christopher, 2581b.
 North, Frederick, 2581b.
 North Adams, Mass., 2581b.

North America, 1479b, 2582a.
 Northampton, Mass., 2593a.
 North Bay, Ont., 2593a.
 North Cape, 2593b.
 North Carolina, 2593b.
 North Carolina, University of, 2598a.
 North Carolina College of Agriculture and Engineering, 2598a.
 Northcliffe, Lord, 2598a.
 North Dakota, 2598b.
 North Dakota, University of, 2601b.
 Northeast Passage, 2605b.
 Norther, 2601b.
 Northern Lights, 287a, 1468b.
 Northern Territory, 2601b.
 North German Confederation, 2603a.
 North Island, N. Z., 2563a.
 Northmen, 2603a.
 North Polar Exploration, 2603b.
 Northrop, Cyrus, 2606b.
 North Sea, 2606b.
 North Star, 2607a, 2885b.
 North Tonawanda, N. Y., 2607a.
 Northwest Boundary, 2607a.
 Northwestern Provinces and Oudh, 3671a.
 Northwestern University, 2607a.
 Northwest Passage, 2605b, 2607b, 3119b.
 Northwest Territories, 2607b.
 Northwest Territory, 2608a.
 Norton, Charles Eliot, 2608a.
 Norton, Lillian, 2579b.
 Norway, 2608b.
 Norwich, Conn., 2612a.
 Norwich, Eng., 2612b.
 Norwood, Ohio, 2612b.
 Nose, 2612b.
 Notary Public, 2613a.
 Notation, 175b.
 Notation (music), 2441a.
 Note, Promissory, 2948b.
 Notre Dame, Cathedral of, 2613a.
 Notre Dame, University of, 2613a.
 Nottingham, Eng., 2613b.
 Notus, 31a.
 Noun, 2048b, 2053a, 2613b.
 Novaculite, 1714a, 2613b.
 Nova Scotia, 2614a.
 Nova Zembla, 2616b.
 Novel, 2616b.
 November, 2617b.
 Novum Organum, 313b.
 Noyes, Alfred, 2618a.
 Noyes, John Humphrey, 2657b.
 N-Rays, 2618b.
 Nubia, 2618b.
 Nuisance, 2618b.
 Nullification, 2619a.
 Numa Pompilius, 2619b.
 Number, 174a.
 Number, Methods of Teaching, 2619b.
 Numbering Machine, 2621a.
 Number-Match, 182a.
 Number Work, 1978a.
 Numbers, Book of, 2621a.
 Numidia, 94a, 2621b.
 Numismatics, 2621b.
 Nummulite, 2622a.
 Nun, 2382b, 2622a.
 Nuncio, 2622a.
 Nuns of Saint Ursula, 3723a.
 Nuremberg, Germany, 2622a.
 Nurse, 2622b.
 Nursery, 2623a.
 Nursery Rhymes, 2423b.
 Nut, 2623b.
 Nutation, 2623b.
 Nutcracker, 2623b.
 Nuthatch, 2624a.
 Nutmeg, 2624a.

Nutrition, 2624b.
 Nux Vomica, 139b, 2644b.
 Nyassa, 2625a.
 Nye, Edgar Wilson, 2625b.
 Nymphs, 2625b.

O

O, 2626a, 2682b.
 Oahu Island, 1643a.
 Oak, 2626a.
 Oak, The (theme), 3558a.
 Oakland, Calif., 2627a.
 Oakum, 2627b.
 Oasis, 2627b.
 Oath, 2627b.
 Oats, 2628a.
 Obelisk, 849a, 2628b.
 Oberammergau, 2628b.
 Oberlin College, 2628b.
 Obesity, 2629a.
 Obi River, 2629a.
 Object Complement, 2048b.
 Oboe, 2629a.
 Observatory, 2629b.
 Obsidian, 2630a.
 Ocarina, 2630a.
 Ocean, 1479b, 1480b, 2631a.
 Ocean Cable, 626a.
 Ocean Currents, 2630a.
 Ocean Grove, N. J., 2632a.
 Oceania, 2632a.
 Oceanic Islands, 1847b.
 Ocelot, 2632a.
 Ochre, 2632b.
 O'Connell, Daniel, 1834a, 2632b.
 O'Connell, William H., 2632b.
 O'Connor, Thomas Power, 2633a.
 Octavia, 2633a.
 Octavius, 285a.
 Octli, 2968b.
 October, 2633a.
 October's Bright Blue Weather, 2019b.
 Octopus, 2634a.
 Odd Fellows, Independent Order of, 2634b.
 Ode, 2634b.
 Odelsting, 2611a.
 Oder River, 2635a.
 Odessa, Ukraine, 2635a.
 Odin, 2635b.
 Odoacer, 3561a.
 Odysseus, 2896a, 3665b.
 Odyssey, 1711b, 2635b.
 Oedipus, 2636a.
 Oenone, 2735b.
 Oesel Island, 2685a.
 Oesophagus, 5b, 2636a.
 Offenbach, Jacques, 2636a.
 Ogden, Utah, 2636b.
 Ogdensburg, N. Y., 2636b.
 Oglethorpe, James Edward, 2637a.
 O. Henry, 2909a.
 Ohio, 2637a.
 Ohio Company, 2643b.
 Ohio River, 2643b.
 Ohio State University, The, 2644a.
 Ohm, 2644a.
 Ohm, Georg Simon, 2644a.
 Ohm's Law, 2644a.
 Oil City, Pa., 2644b.
 Oil Cloth, 2644b.
 Oil Colors, 2702a.
 Oil of Vitriol, 3468a.
 Oil Palm, 2644b.
 Oils, 2644b.
 Ointment, 2645b.
 Ojibwa Indians, 2645b.
 Okapi, 2645b.
 Okhotsk, Sea of, 2645b.
 Oklahoma, 2646a.
 Oklahoma, University of, 2651b.
 Oklahoma City, Okla., 2651b.
 Okra, 1683a, 2652a.

Olcott, Henry S. 3562a.
 Old Age Pensions, 2652a.
 Old Bay State, 2270b.
 Old Bullion, 393a, 2366a.
 Old Dominion, 3776b.
 Oldenburg, 2652b.
 Old Gaelic Lullaby, 2028a.
 Oldham, Eng., 2652b.
 Old Ironsides, 1708a.
 Old Kentucky Home, 1385b.
 Old Line State, 2262b.
 Old-man Cereus, 741a.
 Old Man Eloquent, 22a.
 Old Man of the Mountains, 2530a, 2866a.
 Old Point Comfort, Va., 2652b.
 Old Pretender, The, 3452b.
 Old Red Sandstone, 2653a.
 Old Rough and Ready, 3523b.
 Old South Meeting House, 2653a.
 Olean, N. Y., 2653b.
 Oleander, 2653b.
 Oleomargarine, 2653b.
 Olfactory Nerves, 2613a, 3325b.
 Oligarchy, 1542b.
 Olive, 2654a.
 Olive Oil, 2654a.
 Oliver Optic, 22b.
 Oliver Twist, 1072a.
 Olives, Mount of, 2654b.
 Olivin, 817b.
 Olmsted, Frederick Law, 2654b.
 Olney, Richard, 2654b.
 Olympia, 2655a.
 Olympia, Wash., 2655a.
 Olimpiad, 2655b.
 Olympian Games, 2655b.
 Olympic (ship), 3283b.
 Olympic Mountains, 3809b.
 Olympus, 1567b, 2656a.
 Omaha, Nebr., 2656a.
 Oman, 2656b.
 Omar, Mosque of, 3537b.
 Omar Khayyam, 2657a, 2980a.
 Omega and Alpha, 102a.
 Omens, 2657a.
 Omnibus Bill, 2657a.
 Omsk, Siberia, 2657a.
 On Conciliation with America, 606a.
 Onega, Lake, 2657b.
 Onega River, 2657b.
 Oneida Community, 2657b.
 Oneida Indians, 2657b.
 Oneida Lake, 2658a.
 One-step, 1025b.
 One Sweetly Solemn Thought, 1750b.
 On His Own Blindness, 2342b, 3346a.
 Onion, 2658a.
 Onondaga Indians, 2658a.
 Ontario, 2658a.
 Ontario, Lake, 2662b.
 Onyx, 2662b.
 Opal, 461a.
 Open-hearth Steel, 3418b.
 Open-kettle Method, 683b.
 Ophthalmia, 917a.
 Ophthalmia Neonatorum, 471b.
 Opium, 139b, 2415b, 2664b.
 Opium War, 2665a.
 Oporto, Portugal, 2665a.
 Opossum, 2665b.
 Oppen, Frederick Burr, 2666a.
 Optic Nerve, 1287a.
 Optics, 2101a.
 Optimism, 2666a.
 Oracles, 2666a.
 Oran, Algeria, 2666b.
 Orange, 2666b.
 Orange, N. J., 2668a.
 Orange Free State, 2668a.
 Orangemen, 2668b.
 Orange River, 2669a.
 Orang-utan, 2669a.
 Oration, 2669b.

Oratorio, 2670a.
 Orchestra, 2670a.
 Orchids, 2670a.
 Ordeal, 2670b.
 Order, 2671a.
 Order, Points of, 2749a.
 Order of Saint George, 2671a.
 Order of the Bath, 2671a.
 Order of the Garter, 2671a.
 Orders, Religious, 2382b.
 Orders in Council, 2671b.
 Ordinance of 1787, 2671b.
 Ordinance, 238a.
 Ordnance Department, 226a.
 Ordovician Period, 2671b.
 Ore, 2672a.
 Oreads, 2625b.
 Oregon, 2672a.
 Oregon, University of, 2677a.
 Oregon Fir, 3394a.
 Orestes, 2677a.
 Organ, 2677b.
 Organ of Corti, 1163b.
 Oriental Rugs, 3130a.
 Oriflamme, 2678a.
 Origin of Species, 1031a, 1743a.
 Orillia, Ont., 2678a.
 Orinoco River, 2678b.
 Oriole, 2678b.
 Orion (astronomy), 2679a.
 Orion (mythology), 2678b.
 Orkney Islands, 2679a.
 Orleans (family), 531b, 2679b.
 Orleans, Battle of, 1319b.
 Orleans, France, 2679b.
 Orleans, Louis Philippe, Duke of, 2679b.
 Orleans, Maid of, 1897a.
 Orleans, Philippe, Duke of, 2680a.
 Orleans, Philippe (Regent of France), 2680a.
 Orloff Diamond, 1070b.
 Ornithology, 2680a.
 Ornithorynchus, 1150a.
 Orpheus, 1278a, 2680a.
 Orpheus and Euridice, 1524b.
 Orris Root, 2680b.
 Orsini (family), 2680b.
 Orthoceras, or Othoceratite, 2680b.
 Orthoclase, 1307b.
 Orthography, 2681a.
 Orthopedics, 2684a.
 Orthoptera, 2684a.
 Ortolan, 2684a.
 Oryx, 137b.
 Osage Indians, 2684a.
 Osage Orange, 2684b.
 Osage River, 2684b.
 Osaka, Japan, 2684b.
 Oscar I, 2685a.
 Oscar II, 2685a.
 Osceola, 2685a.
 Osel Island, 2685a.
 Oshawa, Ont., 2685b.
 Oshkosh, Wis., 2685b.
 Osiris, 2685b.
 Oskaloosa, Iowa, 2686a.
 Osler, William, 2686a.
 Osmium, 2686b.
 Osmosis, 2686b.
 Osprey, 1334a.
 Osseous Tissue, 922a.
 Ossining, N. Y., 2686b.
 Ossoli, Sarah Margaret Fuller, 2687a.
 Ostend, Belgium, 2687a.
 Ostend Manifesto, 2687b.
 Osteopathy, 2687b.
 Ostracism, 2687b.
 Ostrich, 457b, 2688a.
 Ostrogoths, 1540a, 1852b.
 Oswego, N. Y., 2689a.
 Opal, 2663a.
 Open Air Schools, 2663a.
 Open Shop, 2663a.
 Opera, 2663a.
 Opera Glass, 2664a.
 Ophir, 2664b.

Ophthalmoscope, 2664b.
 Otho I, 2689a.
 Otis, James, 2690b.
 Ottawa, Ill., 2689b.
 Ottawa, Kan., 2690a.
 Ottawa, Ont., 2690a.
 Ottawa Indians, 2689b.
 Ottawa-Rideau System, 679a.
 Ottawa River, 2690b.
 Otter, 2690b.
 Otto I, 2691a.
 Ottoman Empire, 3649a.
 Ottoman Turks, 3651a.
 Ottumwa, Iowa, 2691a.
 Ouachita River, 3823a.
 Ounce (animal), 2691b.
 Ounce (weight), 2691b.
 Our Mutual Friend, 1072b.
 Outcalt, Richard Felton, 2691b.
 Out-Door Amusements, 1974a.
 Outram, James, 2692a.
 Ouzel, 2692a.
 Ovary, 1354a.
 Oven Bird, 2692a, 3803b.
 Overshot Wheel, 3831a.
 Over the Teacups, 1708b.
 Ovid, 2692a.
 Ovules, 1354a.
 Owen, Robert, 2692b.
 Owensboro, Ky., 2692b.
 Owen Sound, 2692b.
 Owl, 2693a.
 Owl and the Pussy Cat, The, 2022a.
 Owosso, Mich., 2693b.
 Oxalates, 2694a.
 Oxalic Acid, 139b, 2693b.
 Oxenstierna, 3567a.
 Ox-eye Daisy, 817b.
 Ox Family, 3982a.
 Oxford, Eng., 2694a.
 Oxford Movement, 2694a.
 Oxford University, 2694b.
 Oxidation, 2695a.
 Oxide, 2695a.
 Oxidizing Flame, 476b.
 Oxygen, 2695a.
 Oxygenated Water, 1746b.
 Oxyhydrogen Light, 2107b.
 Oyama, Iwao, 2696a.
 Oyster, 2488b, 2696a.
 Oyster Catcher, 2697a.
 Oyster Plant, 2697a.
 Ozaka, Japan, 2684b.
 Ozark Mountains, 2697b.
 Ozone, 767b, 2697b.

P

P, 2698a.
 Pachyderm, 2698a.
 Pacific Cables, 627a.
 Pacific Ocean, 2698a.
 Paddlefish, 2698b.
 Paddy, 3068b.
 Paderewski, Ignace Jan, 2699a, 2883b.
 Padua, Italy, 2699a.
 Paducah, Ky., 2699b.
 Paganini, Niccolò, 2699b.
 Page, Thomas Nelson, 2700a.
 Page, Walter Hines, 2700b.
 Pageant, 2700b.
 Pagoda, 2701a.
 Paine, Thomas, 2701a.
 Paint, 2701b.
 Painter, 2726b.
 Painting, 2701b.
 Pakenham, Edward Michael, 2711a.
 Palace of Versailles, 3762a.
 Palais de l'Elysee, 2737b.
 Palanquin, 2711a.
 Palate, 2711b.
 Palatinate, 2711b.
 Palatine Hill, 3098b, 3106b.
 Paleontology, 2712a.
 Paleozoic Era, 2712a.

Palermo, 2712a.
 Palestine, 2712b.
 Palestine, Texas, 2713a.
 Palestrina, Giovanni Pierluigi da, 2713a.
 Palisades, The, 2553a, 2713b.
 Palladium (metal), 2713b.
 Palladium (statue), 2713b.
 Pallas Athene, 2345b.
 Palm, 2714a.
 Palma, Tomas Estrada, 2714b.
 Palm Beach, Fla., 2714b.
 Palmerston, Henry John, 2715a.
 Palmetto, 2715a.
 Palmetto State, 3359a.
 Palmistry, 2715b.
 Palm Oil, 2716b.
 Palm Sunday, 2716b.
 Palmyra, 2717a.
 Palmyra Palm, 2717a.
 Palo Alto, Battle of, 2717a.
 Palo Alta, Cal., 2717b.
 Palpitation of the Heart, 2717b.
 Pamir, 2717b.
 Pamlico Sound, 2717b.
 Pampangans, 2818a.
 Pampas, 2718a, 3352b.
 Pan, 2718a.
 Panama (city), 2718a.
 Panama, Isthmus of, 2718b.
 Panama, Republic of, 2718b, 3111b.
 Panama Canal, 2720a, 3111b.
 Panama Hat, 2723b.
 Panama-Pacific International Exposition, 2723b.
 Pan-American Congress, 2724a.
 Pan-American Exposition, 2725a.
 Pan-American Union, 2725a.
 Pancake, The (story), 1960b.
 Pancake Tuesday, 3291a.
 Pancreas, The, 2725b.
 Pancreatin, 2725b.
 Pandanus, 3228b.
 Pandora, 2725b.
 Pan-Germanism, 3914b.
 Panhandle, The, 3552a.
 Panhandle State, 3852a.
 Pankhurst, Emmeline, 2726a.
 Pantasote, 2073a.
 Pantheism, 2726a.
 Pantheon, 2726b, 3096b.
 Panther, 2726b, 2969a.
 Pantomime, 2726b.
 Papacy, The, 2900b.
 Papal States, 2726b, 2902a.
 Papaw, 2727a.
 Paper, 2727a.
 Paper Birch, 449a.
 Paper Blockade, 473b.
 Paper Cutting, 1970a.
 Paper Folding, 1968a.
 Paper Money, 2385b.
 Paper Nautilus, 171a, 2492b.
 Paper Sailor, 171a.
 Papier-mache, 2729a.
 Papillae, 3319b.
 Papineau, Louis Joseph, 2729a.
 Paprika, 2729b.
 Papyrus, 2727a, 2729b.
 Para, Brazil, 2730a.
 Parable, 2730a.
 Paracelsus, 2730a.
 Parachute, 2730b.
 Paraclete, 6a.
 Paradise, Birds of, 458b.
 Paradise Lost, 2342b, 2730b.
 Paradise of the Pacific, 3617a.
 Paraffin, 2731a.
 Paraguay, 2731a.
 Paraguay River, 2732a.
 Paraguay Tea, 2279b, 3354b.
 Parallel Bars, 1600b.
 Parallel Drawing, 1132a.
 Parallelogram, 2977a.

Parallelogram of Forces, 2732b.
 Paralysis, 2732b.
 Paramaribo, Dutch Guiana, 2733a.
 Parana River, 2733a.
 Para Nut, 547b.
 Parasites, 314a, 520a, 2733a.
 Parasitic Diseases, 2733b.
 Paravane, 3457b.
 Parcae, 1301b.
 Parcel Post, 2733b.
 Parchment, 2734b.
 Pardon, 2734b.
 Parent and Child, 2734b.
 Parent-Teachers Association, 2734b.
 Paresis, 2735a.
 Parhelion, 2735a.
 Paris (mythology), 2457b, 2735a.
 Paris, France, 2735b.
 Paris, Louis Albert Philippe D'Orleans, 2739b.
 Paris, Tex., 2739b.
 Paris, Treaties of, 2739b.
 Paris, University of, 2740a.
 Paris Green, 139b, 2740b.
 Park, Mungo, 40b.
 Parker, Alton Brooks, 2740b.
 Parker, Francis Wayland, 2740b.
 Parker, Gilbert, 2741a.
 Parkersburg, W. Va., 2741a.
 Parkman, Francis, 2741b.
 Park Mountains, 3088b, 3089a.
 Parks, National, 2741b.
 Parks of Canada, 2743a.
 Parks of the United States, 2741b.
 Parlement, 2743b.
 Parliament, 2743b.
 Parliamentary Law, 2747a.
 Parma, 223a.
 Parnassus, 2749a.
 Parnell, Charles Stewart, 1712a, 2749a.
 Parochial Schools, 2749b.
 Parody, 2749b.
 Parole, 2750a.
 Parrakeet, 2750a.
 Parrhasius, 2703a.
 Parris, Samuel, 3902b.
 Parrish, Maxfield, 2750a.
 Parrot, 2490a, 2750b.
 Parry Sound, 2750b.
 Parsifal, 1545a, 2751a.
 Parsing, 2055a.
 Parsis, 2751a.
 Parsley, 2751b.
 Parsnip, 2751b.
 Parsons, Kan., 2751b.
 Parthenon, 2751b.
 Participle, 2752a.
 Partnership, 2752b.
 Partridge, 1587a, 2753a.
 Partridge, William Ordway, 2753a.
 Par Value, 3425a.
 Pas, Man., 2753b.
 Pasadena, Calif, 2753b.
 Pascal, Blaise, 2754a.
 Pascal's Law, 2754a.
 Pascua Florida, 1352b, 2898b.
 Pasha, 2754a.
 Pasig River, 3614b.
 Pass, 3734a.
 Passaic, N. J., 2754a.
 Passenger Pigeon, 2851b.
 Passion Flower, 2754b.
 Passion Play, 2754b.
 Passover, 2754b.
 Passport, 2755a.
 Pasteur, Louis, 2755a.
 Pastoral Poetry, 2755b.
 Patagonia, 2755b.
 Pate de foie gras, 1536b.
 Patella, 3318b.
 Patent, 2756a.
 Patent (homestead), 1713a.

Patent Leather, 2073a, 2756a.
 Paterson, N. J., 2756b.
 Patmos, 2756b.
 Patna, British India, 2757a.
 Patriarch, 2757a.
 Patrician, 2757a.
 Patrick, Saint, 2757a.
 Patriotism (theme), 3559b.
 Patroclus, 1763b.
 Patroon System, 2757b.
 Patti, Adelina Maria Clorinda, 2757b.
 Paul (Popes), 2757b.
 Paul, Saint, 2758a.
 Paulists, 2758b.
 Paul Revere's Ride, 512a, 3018b.
 Pauncefote, Julian, 2758b.
 Pauperism, 2758b.
 Pavement, 2759a.
 Pawnbroker, 2759b.
 Pawnee, 2760a.
 Pawpaw, 2727a.
 Pawtucket, R. I., 2760a.
 Payne, John Howard, 2760a.
 Payne-Aldrich Law, 3502a, 3516b.
 Pea, 2760b.
 Peabody, George, 2761a.
 Peabody Education Fund, 2760b.
 Peace, Breach of the, 2761a.
 Peace, League to Enforce, 2071a.
 Peace Conference, International, 2761a.
 Peace Offering, 3153a.
 Peace of Utrecht, 3729b.
 Peace River Country, 2762a.
 Peace River Pass, 73a.
 Peach, 2762a.
 Peacock, 2763a.
 Peale, Charles Wilson, 2763b.
 Peale, Rembrandt, 2763b.
 Peanut, 2764a.
 Pear, 2764b.
 Pearl, 461a, 2489a, 2764b.
 Pearl Harbor, 1645a.
 Pearl Spar, 1093a.
 Peary, Robert Edwin, 2765a.
 Peary's Expedition, 2603b.
 Peasants' War, 2765b.
 Peat, 2766a.
 Pecan, 2766a.
 Peccary, 2766b.
 Peck, James, 1775a.
 Pecos River, 2766b.
 Pedagogy, 2766b, 2960a.
 Pediment, 2767b.
 Pedometer, 2767b.
 Pedro II, 2768a.
 Peel, Robert, 2768a.
 Peer, 2768a.
 Peerage, 2768a.
 Pegasus, 2768a.
 Pekin, Ill., 2768b.
 Peking, China, 2768b.
 Pelagic Islands, 1847b.
 Pelasgians, 2769b.
 Pelee, Mont, 2261b.
 Pelican, 2769b.
 Pelican State, The, 2173a.
 Pellagra, 2770a.
 Peloponnesian War, 1570a.
 Peloponnesus, 2770a.
 Pelops, 2770a.
 Pelvis, The, 2770b, 3318b.
 Pelvic Girdle, 3318b.
 Pemberton, John Clifford, 2770b.
 Pembroke, Ont., 2770b.
 Pemmican, 2770b.
 Pen, 2771a.
 Penance, 2771b.
 Penang, 2771b.
 Pencil, 2771b.
 Pendant, 2772a.
 Pendennis, 3554b.
 Pendleton, Ore., 2772a.
 Pendulum, 2772a.

- Penelope, 2773a, 3665b.
 Penguin, 2773a.
 Peninsula State, The, 1349a, 2326a.
 Peninsular War, 2472a, 2773b.
 Penn, William, 2774a.
 Pennacook, 2774b.
 Pennell, Joseph, 2774b.
 Pennsylvania, 2775a.
 Pennsylvania, University of, 2780b.
 Penny, 2781a.
 Pennyroyal, 2781a.
 Penobscot River, 2781a.
 Pensacola, Fla., 2781a.
 Pension, 2781b.
 Pension, Old Age, 2652a.
 Pentameter, 2311b.
 Pentateuch, 2782b.
 Pentecost, 2782b.
 Penumbra, 2783a.
 Peonage, 2783a.
 Peony, 2783a.
 People's Party, 2891a.
 Peoria, Ill., 2783a.
 Pepin, 2783b.
 Peplos, 1143b.
 Pepper, 2784a.
 Pepperidge, 465a.
 Peppermint, 2784b.
 Pepsin, 2784b.
 Peptones, 2784b.
 Pepys, Samuel, 2784b.
 Pequot, 2784b.
 Percentage, 2784b.
 Perception, 2787b.
 Perch, 2788a.
 Perennials, 428b, 2788a.
 Perfumes, 2788a.
 Pericardium, 1655b, 2789a.
 Pericles, 2789a.
 Peridot, 461a, 817b.
 Perigee, 2789b.
 Periosteum, 498b.
 Peripatetic School of Philosophy, 173a, 2789b.
 Periscope, 3454b.
 Peritoneum, 5b.
 Peritonitis, 2790a.
 Periwinkle, 2447a.
 Perjury, 2790a.
 Perkins, George Walbridge, 2790a.
 Permian Period, 2790b.
 Pernambuco, Brazil, 2790b.
 Peroxide of Hydrogen, 1746b.
 Perpetual Motion, 2791a, 2836b.
 Perrault, Charles, 2423b, 2791a.
 Perry, Bliss, 2791a.
 Perry, Matthew Calbraith, 2791b.
 Perry, Oliver Hazard, 2791b.
 Perryville, Battle of, 2792a.
 Persephone, 2950a.
 Persepolis, 2792a.
 Perseus, 2792a.
 Pershing, John Joseph, 2792b, 3932b.
 Persia, 2793a.
 Persian Gulf, 2796b.
 Persian Wars, 1572b.
 Persian Wheel, 2796b.
 Persimmon, 2796b.
 Personal Property, 2796b.
 Personification, 2797a.
 Perspective, 1118a, 2797a.
 Perspiration, 2797b.
 Perth, Western Australia, 2797b.
 Perth Amboy, N. J., 2797b.
 Peru, 2798a.
 Peru, Ill., 2800a.
 Peru, Ind., 2800a.
 Perugino, Pietro Vannucci, 2800b.
 Peruvian Bark, 2800b.
 Peruvian Current, 2630b.
 Peseta, 2800b.
 Peso, 2800b.
 Pessimism, 2666a, 2801a.
 Pestalozzi, Johann Heinrich, 2767a, 2801a.
 Petain, Henri Philippe, 2801b.
 Petals, 1354a.
 Peter, 2802a.
 Peter I (Serbia), 2802b.
 Peterborough, Ont., 2803a.
 Petersburg, Siege of, 2803b.
 Petersburg, Va., 2803a.
 Peter the Great, 725a, 2802a, 3095a.
 Peter the Hermit, 997a, 2803b.
 Petition, 2803b.
 Petition of Right, 2804a.
 Petit Jury, 1919b.
 Petrarch, Francesco, 2804a.
 Petrel, 2804a.
 Petrograd, Russia, 2804b.
 Petroleum, 2806a, 3678a.
 Petunia, 2807b.
 Pewee, 2823b.
 Pewter, 2807b.
 Phaedra, 2808a.
 Phaedrus, 1290a.
 Phaethon, 2452a, 2808a.
 Phalanges, 1368a, 1623a, 3318b.
 Phalanx, 2808a.
 Phanerogamous Plants, 517a, 518b, 2808a.
 Pharaoh, 1190b, 2808b.
 Pharaoh's Hen, 3792b.
 Pharaoh's Rat, 1757a.
 Pharisees, 2808b.
 Pharmacist, 146a.
 Pharmacopoeia, 2808b.
 Pharmacy, 2809a.
 Pharos, 2809a.
 Pharynx, 2809a.
 Pheasant, 1587a, 2809a.
 Pheasant's Eye, 27b.
 Phenacetin, 139b, 2809b.
 Phenic Acid, 700a.
 Phenol, 700a.
 Phi Beta Kappa, 2809b.
 Phidias, 2810a.
 Phi Kappa Phi, 2810a.
 Philadelphia, Pa., 2810b.
 Philae, 2813b.
 Philemon, 364a.
 Philip (the Evangelist), 2813b.
 Philip IV (France), 2814a.
 Philip VI (France), 2814a.
 Philip II (Spain), 2814a.
 Philip V (Spain), 2814b.
 Philip of Macedon, 2814b, 3377a.
 Philippics, 1056a, 1574b.
 Philippine Islands, 2815a.
 Philip the Fair, 2814a.
 Philistines, 2820a.
 Phillips, Wendell, 2820a.
 Philology, 2820a.
 Philomela, 2822a.
 Philosopher's Stone, 75b.
 Philosophy, 2822b.
 Phlox, 2823b.
 Phoebe, 2823b.
 Phoenicia, 2824a.
 Phoenicians, 3373a.
 Phoenix, 2824b.
 Phoenix, Ariz., 2824b.
 Phonetics, 2825a.
 Phonograph, 1823a, 3505a.
 Phonography, 3287b.
 Phosphates, 2825a.
 Phosphorescence, 2825b.
 Phosphoric Acid, 2825b.
 Phosphorus, 139b, 2825b.
 Phossy Jaw, 2826a.
 Photo-Engraving, 2826a.
 Photographic Surveying, 2826a.
 Photography, 2826b.
 Photogravure, 2827b.
 Photometry, 2828a.
 Photosphere, 3470b.
 Phrenology, 2828a.
 Phrygia, 2829a.
 Phylloxera, 1080b, 2829a.
 Physical Culture, 2830a.
 Physical Geography, 1461b, 2829b.
 Physical Work, Unit of, 3670b.
 Physics, 2835b.
 Physiognomy, 2840a.
 Physiography, 1461b, 2829b.
 Physiology, 2840b.
 Pia mater, 542a.
 Pianissimo, 2442a.
 Piano, 2846a.
 Pianoplayer, 2846b.
 Piaster, 2846b.
 Picadores, 598b.
 Piccalilli, 2847a.
 Piccolo, 2846b.
 Pickerel, 2847a, 2852b.
 Pickering, John, 1775a.
 Pickett, George Edward, 2847a.
 Pickles, 2847a.
 Picric Acid, 2847a.
 Picts, 2847b.
 Pickwick Papers, 1072a.
 Pictured Rocks, 3473b.
 Picture-Making Material, 1953a.
 Picture Study, 2706b.
 Piedmont, 2847b.
 Piedmont Region, 2847b.
 Pied Piper of Hamelin, The (theme), 3559a.
 Pieplant, 3067a.
 Pier, 2847b.
 Pierce, Franklin, 2848a.
 Pierre, S. D., 2851a.
 Pigeon, 1108b, 2851a.
 Pigeon Berry, 2882b.
 Pigment, 2701b.
 Pig-tailed Baboon, 310a.
 Pigweed, 2851b.
 Pika, 2852a.
 Pike, 2852a.
 Pike, Zebulon Montgomery, 2852a.
 Pikes Peak, 885b, 2852b.
 Pilaster, 2852b.
 Pilate, Pontius, 2852b.
 Pilcomayo, 2852b.
 Pile, 2853a.
 Pilgrims, 2853a, 3555b.
 Pilgrim's Progress, 602a.
 Pillars of Hercules, 277a, 1510a.
 Pillory, 2853a.
 Pilot, 2853b.
 Pilot Fish, 2853b.
 Pilsudski, Joseph, 2883b.
 Pilum, 222b.
 Pima, 2853b.
 Pimento, 2853b.
 Pin, 2853b.
 Pinafore, 1511a, 3467a.
 Pina Muslin, 2856b.
 Pinchot, Gifford, 2854a.
 Pincian Hill, 3099a.
 Pinckney, Charles Cotesworth, 2854b.
 Pincon, Yanez, 108b.
 Pindar, 2854b.
 Pine, 916b, 2854b.
 Pineapple, 2856a.
 Pine Barren Beauty, 2976b, 3359a.
 Pine Bluff, Ark., 2856b.
 Pine Family, 916b.
 Pinero, Arthur Wing, 2856b.
 Pines, Isle of, 2856b.
 Pine Tree Shilling, 2857a.
 Pine Tree State, The, 2222b.
 Ping Pong, 2857a.
 Pink, 2857a.
 Pin Money, 2857a.
 Pin Pool, 2899b.
 Pipe, Tobacco, 2857a.
 Pipe Clay, 844b.
 Pipefish, 2857b.
 Pipe Lines, 2857b.
 Pipe of Peace, 647a.
 Pipit, 2858a.
 Pippa Passes, 547b.
 Pippin, 2783b.
 Pippin the Short, 709a.
 Piqua, Ohio, 2858a.
 Piquet, 2858b.
 Piracy, 2858b.

Piraeus, 2858b.
 Pirates of Penzance, 1511a, 3467a.
 Pisa, Council of, 2859a.
 Pisa, Italy, 2859a.
 Pisa, Leaning Tower of, 2859a.
 Pisces, 1330b, 2859b.
 Pisciculture, 1330b.
 Pisistratus, 271b, 2859b.
 Pistachio, 2859b.
 Pistil, 519a, 1354a.
 Pistol, 3057b.
 Pitchblende, 2859b.
 Pitcher Plant, 521a, 2859b.
 Pitch Lake, 3635a.
 Pitman (family), 2860a, 3287a, 3288b.
 Pitt (family), 2860b.
 Pitti Palace, 2861a.
 Pittsburg, Kan., 2861a.
 Pittsburgh, Pa., 2861b.
 Pittsburgh Landing, Battle of, 3280b.
 Pittsfield, Mass., 2862b.
 Pittston, Pa., 2863a.
 Pius (Popes), 2863a.
 Pixies, 1294a.
 Pizarro, 1776b, 2863b.
 Place de l'Etoile, 2737a.
 Place Vendome, 3748a.
 Plague, 2864a.
 Plain, 2864b.
 Plane, 2864b.
 Planet, 267a, 2865a.
 Planetesimal Hypothesis, 1167b, 1477a.
 Planetoid, 257a, 2865a, 2866a.
 Planing Machine, 2866a.
 Plantagenet, 2869a.
 Plantain, 2969a.
 Plant Families, 523a.
 Plant Industry, Bureau of, 51a.
 Planting of the Apple-Tree, The, 2037a.
 Plant Lice, 144b.
 Plants, 2487a, 2866b, 3338b.
 Plants, Aromatic, 231b.
 Plastering, 2869b.
 Plaster of Paris, 2869b.
 Plata, Rio de la, 3077b.
 Plataea, 2869b.
 Plateau, 2870a.
 Plate Glass, 1522a.
 Platform Scale, 3842b.
 Plating, 2870a.
 Platinum, 2870a.
 Plato, 2871a.
 Platoon, 226b.
 Platt, Thomas Collier, 2871b.
 Plattdeutsch, 2871b.
 Platt National Park, 2742b.
 Platte River, 2871b.
 Plattsburg, N. Y., 2872a.
 Plattsburg Idea, 2872a.
 Plautus, Titus Maccius, 2872a.
 Play Hide and Go Seek, 182a.
 Plays, 1438b.
 Plebeians, 2872b.
 Pleiades, 2872b.
 Pleura, 5b, 2872b.
 Pliny the Elder, 2873a.
 Pliny the Younger, 2873a.
 Pliocene Period, 2873a.
 Plough Monday, 2383b.
 Plover, 2873b.
 Plow, 2873b.
 Plum, 2874a.
 Plumage, 456a.
 Plumbing, 1101b, 2874a.
 Plumb Line, 2874b.
 Plummet, 2874b.
 Plush, 2874b, 3747b.
 Plutarch, 2875a.
 Plutarch's Lives, 2875a.
 Pluto, 2454b, 2875a.
 Plutus, 2875a.
 Plymouth, Eng., 2875b.
 Plymouth, Mass., 2875b.
 Plymouth, Pa., 2876a.
 Plymouth Colony, 2876a, 3701b.
 Plymouth Company, 2875b.

Plymouth Plantation, History of, 538b.
 Plymouth Rock, 2876a.
 Pneumatics, 2876b.
 Pneumatic Tires, 2876b.
 Pneumatic Tools, 2877a.
 Pneumatic Tubes, 2877b.
 Pneumogastric Nerve, 2507b.
 Pneumonia, 2877b.
 Po River, 2877b.
 Pocahontas, 2878a, 3327a.
 Pocatello, Ida., 2878a.
 Poe, Edgar Allan, 2878a.
 Poem, 2033b, 2052a.
 Poem, Study of a, 2021b, 2029a.
 Poet Laureate, 2878b.
 Poetry, 2879a.
 Poet's Corner, 3851a.
 Pogy, 2298a.
 Poincare, Raymond, 2880a.
 Poinsettia, 2880a.
 Point Barrow, 64a.
 Pointer, 2880a.
 Point of Order, 2749a.
 Poison, 2880b.
 Poison Gas, 2881a.
 Poison Ivy, 2882a.
 Poisonous Plants, 2882a.
 Poitiers, France, 2882b.
 Poker, 2882b.
 Pokeweed, 2882b.
 Poland, 2883a.
 Polar Exploration, 2603b, 3366b.
 Polar Hare, 1628a.
 Polariscope, 2884b.
 Polarization of Light, 2884b.
 Pole, 2885a.
 Polecat, 2885a.
 Pole Star, 2885b.
 Pole Vault, 274a, 2885b.
 Police, 2885b.
 Polish Succession, War of the, 3459a.
 Political Divisions, 1465a.
 Political Economy, 1175a.
 Political Geography, 1461b.
 Political Parties in the United States, 2886a.
 Polk, James Knox, 2891b.
 Polka, 1025a.
 Pollen, 1354a, 2894b.
 Pollination, 2895a.
 Poll Tax, 2895a.
 Pollux, 720b.
 Polo, 2895a.
 Polo, Marco, 2895b.
 Polygamy, 2257a, 2895b.
 Polygon, 2299a, 2895b.
 Polyhymnia, 2438b.
 Polynesia, 2632a, 2896a.
 Polyp, 2896a.
 Polyphemus, 2635b, 2896a.
 Polytheism, 2390a, 2896b.
 Pomegranate, 2896b.
 Pomelo, 1554b.
 Pomerania, 2896b.
 Pomeranian Dog, 3387b.
 Pomona, 2896b.
 Pomona, Calif., 2896b.
 Pompadour, Madame de, 2172a, 2897a.
 Pompano, 2897a.
 Pompeii, 2897a.
 Pompey, 2898a.
 Pompey's Pillar, 2898a.
 Ponce de Leon, 1387a, 2898b, 2913b.
 Pond Lily, 3827a.
 Pons Sublicus 555a.
 Pontchartrain, Lake, 2898b.
 Pontiac (Indian), 2898b.
 Pontiac, Mich., 2899a.
 Pontoon Bridge, 2899a.
 Pontoon Euxinus, 466b.
 Poodle, 2899a.
 Pool, 2899a.
 Poole, William Frederick, 2900a.

Poona, British India, 2900a.
 Poor Priests, 3951b.
 Poor Richard's Almanac, 100b, 1403b, 2900b.
 Poor Robin's Almanack, 100b.
 Pop Corn, 2488b.
 Pope, 2900b, 3093b.
 Pope, Alexander, 2903b.
 Poplar, 251a, 2904a.
 Poplin, 2904a.
 Popocatepetl, 2904a.
 Poppy, 2904a.
 Poppy Family, 525a.
 Popular Sovereignty, 3395b.
 Population, 2904b.
 Population, Center of, 3690a.
 Population, Density of, 3690a.
 Populist Party, 2891a.
 Porcelain, 2906a, 2925b.
 Porcelain, Sevres, 3263b.
 Porcelain Clay, 844b.
 Porcelain Jasper, 1879a.
 Porch of the Maidens, 1249b.
 Porcupine, 2906a.
 Porcupine, Ont., 2906b.
 Porcupine Ant-eater, 137a.
 Porgy, 2906b.
 Pork, 1705a, 2906b.
 Porosity, 2906b.
 Porphyry, 2907a.
 Porpoise, 2907a.
 Porpoise Oil, 389a.
 Port Adelaide, 24b.
 Portage La Prairie, Man., 2907a.
 Portala, 3187a.
 Portal Circulation, 826b.
 Portal Vein, 2143b.
 Port Arthur, Manchuria, 2907b.
 Port Arthur, Ont., 2907b.
 Port Arthur, Siege of, 3146b.
 Port Arthur, Tex., 2908a.
 Port-au-Prince, Haiti, 2908a.
 Porte, The Sublime, 925a.
 Port Elizabeth, Cape of Good Hope, 2908b.
 Porter, David, 2908b.
 Porter, David Dixon, 2908b.
 Porter, Jane, 2909a.
 Porter, William Sydney, 2909a.
 Port Hope, Ont., 2909b.
 Port Huron, Mich., 2909b.
 Portinari, Beatrice, 1026b.
 Portland, Maine, 2910a.
 Portland, Ore., 2910a.
 Portland Cement, 735b.
 Port Nelson, 1730a.
 Porto Alegre, Brazil, 2911a.
 Port of Entry, 2911a.
 Port of Spain, Trinidad, 2911b, 3622a.
 Porto Rico, 2911b.
 Port Said, Egypt, 2914a.
 Portsmouth, Eng., 2914a.
 Portsmouth, N. H., 2914a.
 Portsmouth, Ohio, 2914b.
 Portsmouth, Va., 2914b.
 Portugal, 2915a.
 Portuguese Colonies, 882b.
 Portuguese East Africa, 2918b.
 Portuguese Guinea, 2919a.
 Port Wine, 2919a.
 Posen, 2919a.
 Possessions of the United States, 3694a.
 Postage Stamps, 2919a.
 Postal Savings Banks, 3205a.
 Postal Union, International, 2919b.
 Postoffice Department, 2920a.
 Potash, 2922a.
 Potassium, 2922b.
 Ptoassium Bitartrate, 983b.
 Potato, 2922b, 2491a.
 Potato, Sweet, 3484a.
 Potato Bug, 2923b.
 Potential Energy, 1225a.
 Potomac River, 2924a.
 Potsdam, Prussia, 2924a.

- Potawatomi Indians, 2924a.
 Potter's Clay, 844b.
 Pottery, 2924b.
 Pottstown, Pa., 2925b.
 Pottsville, Pa., 2926a.
 Poughkeepsie, N. Y., 2926a.
 Poultry, 2926b, 3685a.
 Pound 2927a.
 Poundal, 1159a.
 Pound Sterling, 2927b.
 Powderly, Terence Vincent, 2927b.
 Powell, John Wesley, 2927b.
 Powell, Maud, 2927b.
 Power, 2928a.
 Power of Attorney, 2928a.
 Powers, Hiram, 2928a.
 Powers of Congress, 916a.
 Powers of Parliament (Canada), 2746a.
 Powhatan, 2928b, 3327a.
 Praetor, 2928b.
 Praetorian Guard, 2928b.
 Pragmatic Sanction, 2929a.
 Prague, Bohemia, 2929a.
 Prague, University of, 2929b.
 Prairie, 2929b, 3674b.
 Prairie Chicken, 2930a.
 Prairie Dog, 2930a.
 Prairie Hare, 1628a.
 Prairie Schooner, 1923a.
 Prairie Squirrel, 1537a.
 Prairie State, The, 1764a.
 Praxiteles, 2930a, 3232a.
 Prayer Rug, 3130a.
 Precedence, Illustration of, 2748b.
 Precession of the Equinoxes, 2930b.
 Precious Stones, 2930b.
 Predestination, 2931a.
 Preemption, 2931a.
 Prefect, 1061a.
 Premier, 2931b.
 Preposition, 2932a.
 Pre-Raphaelites, 2932a.
 Presbyterians, 2932a.
 Prescott, Ariz., 2933a.
 Prescott, William Hickling, 2933a.
 President of the United States, 2933b.
 Presidio, 3186b.
 Press, Liberty of the, 2095b.
 Pressburg, Hungary, 2936b.
 Preston, Ont., 2936b.
 Pretoria, Transvaal, 2937a.
 Prevailing Westerlies, 2937a.
 Previous Question, 2749a.
 Pre-Vocational Education, 3785b.
 Priam, king of Troy, 2458b, 2937a.
 Pribilof Islands, 395b, 3240b, 2937a.
 Prickly Ash, 2937b.
 Prickly Pear, 2937b.
 Pride's Purge, 3134a.
 Priest, 2938a.
 Priesthood, The, 3093b.
 Primary Colors, 884b.
 Primary Department, 1977b.
 Primary Election, 2938a.
 Primates, 2938b.
 Primogeniture, 2938b.
 Primrose, 2938b.
 Prince, 2939a.
 Prince Albert, Sask., 2939a.
 Prince Edward Island, 2939b.
 Prince Henry of Battenberg, 3768b.
 Prince of India, The, 3798a.
 Prince of Wales, 3796b.
 Prince of Wales Island, 66a.
 Prince Rupert, B. C., 2940a.
 Princess, The, 3543b.
 Princeton, Battle of, 2940b.
 Princeton, N. J., 2940b.
 Princeton University, 2940b.
 Princip, Gavriilo, 3915a.
 Printing, 2941a.
 Printing Press, 1823a, 2942b.
 Printing Telegraph, 3530a.
 Priory, 2a.
 Prism, 2943a.
 Prison, 2943b.
 Prisoners of War, 2944b.
 Pristarchus, 265a.
 Private Banks, 333b.
 Privateer, 2944b.
 Privy Council, 2944b.
 Privy Seal, 2945a.
 Prix de Rome, 1175a.
 Prize Fighting, 2945a.
 Probate, 2945b.
 Procedure, 2945b.
 Proctor, Adelaide Anne, 2946a.
 Proctor, Richard Anthony, 2946a.
 Production, 3419a.
 Profit Sharing, 2946b.
 Program Music, 398a.
 Progress and Poverty, 3312a.
 Progression, 2946b.
 Progressive Party, 2891a, 3112a, 3503a.
 Prohibition, 2947a, 3718b, 3888a.
 Prohibition Party, 2890b.
 Prometheus, 2725b, 2948b.
 Promissory Note, 2948b.
 Pronghorn, 2948b.
 Pronoun, 2949a.
 Proof and Proof Reading, 2949a.
 Proportion, 2950a.
 Prosecuting Attorney, 1083a.
 Prose Edda, 3331b.
 Proserpina, 2950a.
 Proserpina, Story of, 2454b.
 Protagoras, 3346b.
 Protection, 1409b, 2950b.
 Protective Coloration and Mimicry, 2950b.
 Protective Tariff, 3515a.
 Protectorate, 2951a, 3460b.
 Proteids, 2784b, 2951a.
 Proteins, 1096b, 1367a, 2951a.
 Proterozoic Era, 2951b.
 Protesilaus, 2951b.
 Protestant Episcopal Church, 1247b.
 Protestant Missions, 2359b.
 Protestants, 2951b.
 Protoplasm, 2951b.
 Protozoa, 2952a.
 Proud Flesh, 1553b.
 Proudhon, Pierre Joseph, 2952a.
 Provencal Langauge and Literature, 2952b.
 Proverbs, 2952b.
 Providence, R. I., 2952b.
 Province, 2953b.
 Provincial Courts in Canada, 295a.
 Provo City, Utah, 295b.
 Prune, 2955b.
 Pruning, 2955b.
 Prussia, 1499b, 2956a.
 Prussic Acid, 2957b.
 Psalms, Book of, 1749b, 2957b.
 Pseudonym, 2958a.
 Psyche, 2958a.
 Psychology, 2958a, 2960a.
 Ptarmigan, 2963a.
 Pteridophytes, 516b, 518a, 2963b.
 Pterodactyl, 2963b.
 Ptolemy (author), 2964b.
 Ptolemy (family of kings), 2964a.
 Ptolemy, Claudius, 265a.
 Ptolemy Philadelphus, 83a.
 Ptolemy Soter, 83a.
 Ptomaine Poisoning, 2964b.
 Ptomaines, 314b, 2964b.
 Public Defender, 2964b.
 Public Lands, 2012a, 2013b.
 Public Lands in Canada, 2014a.
 Public Roads, Office of, 51b.
 Public Schools, 3213b.
 Public Utilities, 2965a.
 Publius Ovidius Naso, 2692a.
 Puccini, Giacomo, 2965b.
 Puck, 2965b.
 Pudding Stone, 912b.
 Pudd'nhead Wilson, 1325a.
 Puebla, Mexico, 2965b.
 Pueblo (illustration), 2589a, 2965b.
 Pueblo, Colo., 2966a.
 Puff Adder, 23a, 3775b.
 Puffball, 2966b.
 Puffin, 2966b.
 Puffing Billy, 2149b.
 Pug, 2967a.
 Puget Sound, 2967a, 3810a.
 Puisne Judge, 2967b.
 Pulaski, Casimir, 2967b.
 Pulitzer, Joseph, 1910b, 2967b.
 Pulley, 2968a.
 Pullman, George Mortimer, 2968a.
 Pulmonary Artery, 5b.
 Pulmonary Circulation, 826b.
 Pulmonary Veins, 1656a.
 Pulmotor, 2968b.
 Pulque, 2320b, 2968b.
 Pulse, 2842a, 2968b.
 Pulse Family, 526a, 2080a.
 Pultowa, Battle of, 1319b.
 Puma, 2726b, 2969a.
 Pumice, 2969a.
 Pump, 2969a.
 Pumpkin, 2970a.
 Punctuation, 2970a.
 Punda, 2993b.
 Punic Wars, 2970b, 3100b.
 Punishment, 791a.
 Punjab, 2970b.
 Punt, 482a.
 Punta Arenas, Chile, 2970b, 3580b.
 Pupa, 616a, 724b, 1807b, 2970b.
 Purdue University, 2971a.
 Pure Democracy, 1542a.
 Pure Food Laws, 2971a.
 Purgatory, 2971a.
 Puritans, 2971b, 3902b.
 Purple Flag, 1836a.
 Purple Grackle, 996a.
 Purple Martin, 3479a.
 Purslane, 2971b.
 Pursley, 2971b.
 Pusley, 2971b.
 Puss in Boots, 2791a.
 Pussy-Willow, 3880a.
 Pustules, 3325a.
 Putnam, Israel, 2971b.
 Putnam, Rufus, 2643b, 2972a.
 Putrefaction, 2972a.
 Puttees, 3668b.
 Putty, 2972b.
 Pygmalion, 2972b.
 Pygmies, 2972b.
 Pyle, Howard, 2972b.
 Pym, John, 2973a.
 Pyorrhoea, 2973a.
 Pyramid (mathematics), 209a, 2973a.
 Pyramid Dynasty, 1190b.
 Pyramids, 2973b, 3592b.
 Pyramus, 2974b.
 Pyrenees Mountains, 2974b.
 Pyrite, 1837b, 2975a.
 Pyrocellulose, 1596a.
 Pyrometer, 2975a.
 Pyrotechny, 2975b.
 Pyroxene, 282b, 2975b.
 Pyroxylin, 1596a.
 Pyrrha, 1066a.
 Pyrrhus, 2975b.
 Pythagoras, 2976a.
 Pythagorean Theorem, 2976a.
 Pythian Games, 2976a.

Pythias, Knights of, 1989a.
 Pythias and Damon, 1023b.
 Python (mythology), 2976b.
 Python (serpent), 2976b.
 Pyxie, 2976b.

Q

Q, 2977a.
 Quadrant, 2977a.
 Quadrilateral, 2977a.
 Quadrille, 1025a, 2977a.
 Quadroon, 2977a.
 Quadruple Alliance, 2977b.
 Quaestor, 2977b.
 Quahog, 841b.
 Quail, 2977b.
 Quaker City, 2810b.
 Quakers, 2978a.
 Quantity, 2978b.
 Quapaw, 2978b.
 Quarantine, 2978b.
 Quarry and Quarrying, 2978b.
 Quart, 2979b.
 Quarter-deck, 2979b.
 Quartermaster, 2979b.
 Quartermaster Corps, 226a.
 Quartz, 2979b.
 Quartzite, 2980a.
 Quartz Vein, 2980a.
 Quassia, 2980a.
 Quaternary Period, 2980a.
 Quatrain, 2980a.
 Quebec (province), 2980b.
 Quebec, Battle of, 2984b.
 Quebec, City of, 2985a.
 Quebec Act, 2986b.
 Quebec Bridge, 556a.
 Quebec Resolutions, 2986b.
 Quebec Tercentenary, 2987a.
 Queen, 2987a.
 Queen Anne's War, 1412b.
 Queen Charlotte Islands, 2987a.
 Queen of Roads, 147b.
 Queensberry, John Sholto Douglas, 2987a.
 Queensland, 2987a.
 Queenston Heights, Battle of, 2988a.
 Queenstown, Ireland, 2988b.
 Quest of the Holy Grail, 2b.
 Quetzal, 2988b, 3637b.
 Quetzalcoatl, 308b, 2988b.
 Quichuas, 491a.
 Quicksand, 2988b.
 Quicksilver, 2304b.
 Quiller-Couch, Arthur Thomas, 2989a.
 Quince, 2989a.
 Quincy, Ill., 2989a.
 Quincy, Josiah, 2989b.
 Quincy, Mass., 2989b.
 Quinine, 2989b.
 Quinoa, 1537a.
 Quinsy, 2990a.
 Quintilian, 2990a.
 Quintroon, 2977a.
 Quirinal, 2990a, 3098b.
 Quit Claim Deed, 1047a.
 Quito, 2990b.
 Quoits, 2990b.
 Quorum, 2990b.
 Quotation Mark, 2991a.
 Quo Vadis, 3298a.
 Quo Warranto, 3949b.

R

R, 2992a.
 Rabbi, 2992a.
 Rabbit, 1627b, 2992a.
 Rabelais, Francois, 2992b.
 Raccoon, 2993a.
 Race, 2993b.
 Racer Crabs, 979b.
 Races of Men, 2994a.
 Rachel (Bible), 2995b.
 Rachel-Felix, Elizabeth, 2995a.

Racine, Jean, 2995b.
 Racine, Wis., 2996a.
 Rack, 2996a.
 Radcliffe College, 2996a.
 Radiata, 2996b.
 Radiation, 1657a.
 Radiolaria, 2996b.
 Radio Telegraph, 2996b.
 Radio Telephone, 2996b.
 Radish, 2996b.
 Radium, 2996b.
 Radius, 826a.
 Raffia, 355b, 2997b.
 Ragnarok, 2464b.
 Ragtime, 2998a.
 Ragweed, 2998a.
 Raikes, Robert, 2998a, 3472a.
 Rail, 2998a.
 Railroad, 2998a.
 Railroads in the U. S., 3687b.
 Railroads of Canada, 3002a.
 Railroad War Board, 3001a.
 Railway Postoffice, 2920b.
 Rain, 2021a, 3003a.
 Rainbow, 1467b, 3004b.
 Rainbow, The (theme), 3557b.
 Rainbow Bridge, 3726a.
 Rainfall in the U. S., 3677a.
 Rain Gauge, 3005b.
 Rain Goose, 1084a.
 Rainier, Mount, 3005a.
 Rainy Lake, 3005a.
 Raisin River, Massacre of, 3005a.
 Raisins, 3005b.
 Rajah, 3005b.
 Rajputana, 3005b.
 Raleigh, N. C., 3006a.
 Raleigh, Walter, 3006b, 3779b.
 Ralph Roister Doister, 1114a, 3664a.
 Ramayana, 3007a.
 Ramee, Louise de la, 3007a.
 Rameses II, 1190b, 3007a.
 Rameses III, 1190b.
 Ramie, 486b.
 Ramolino, Letizia, 2470b.
 Ramona, 1864b.
 Ranavalona II, 2210 a.
 Randolph, Edmund Jennings, 3007a.
 Randolph, John, 3007b.
 Random Masonry, 2269b.
 Rangoon, Burma, 3007b.
 Ranjit Singh, 3302b.
 Ranke, Leopold von, 3008b.
 Rankin Jeannette, 2399a, 3008b.
 Rank in Army and Navy, 3008a.
 Ranunculus, 3009a.
 Rape of Lucrece, The, 3268a.
 Rape of the Sabines, 3099b.
 Raphael, 2705a, 3009a.
 Rapids, 723a.
 Rappahannock River, 3009b.
 Raspberry, 3009b.
 Rat, 3010a.
 Ratchet, 3010a.
 Ratel, 3010a.
 Ratio, 3010a.
 Rattan, 3010b.
 Rattlesnake, 2490a, 3010b.
 Raven, 3011a.
 Ravine Deer, 1456b.
 Ray, 3011b.
 Razor, 3011b.
 Reaction, 3011b.
 Read, Opie Percival, 3011b.
 Read, Thomas Buchanan, 3012a.
 Reade, Charles, 3012a.
 Reading, 3012a.
 Reading, Methods of Teaching, 3028a.
 Reading, Pa., 3029b.
 Reading of Earley, Lord, 3029b.
 Reagan, John Henninger, 3030a.
 Real-estate Mortgage, 2418b.
 Realism, 3030b.

Real Property, 3030b.
 Realschulen, 1494a.
 Reaping Machine, 1823a, 2199a, 3030b.
 Rear-Admiral, 26b.
 Reason, 1263a, 2958b, 2962b, 3031a.
 Rebecca of Sunnybrook Farm, 2135a.
 Rebekah, 407a.
 Rebellion of 1837, 3032a.
 Recall, The, 3032b.
 Receipt, 3032b.
 Receiver, 3032b.
 Recessional, The, 1984a.
 Recife, Brazil, 2790b.
 Reciprocity, 3033a, 3515b.
 Reclamation Act, 1842a.
 Reclamation Service, 3033b.
 Reconstruction, 3034a, 3711a.
 Rectangle, 3035a.
 Rectified Spirits, 76a.
 Rectum, 1822a.
 Red, 3035a.
 Redbird, 703a, 3035a.
 Red Cedar, 3035a.
 Red Cloud, 3035a.
 Red Cross Society, 349a, 3035b.
 Red Jacket, 3036a.
 Redlands, Calif, 3036a.
 Red Letter Days, 1312b.
 Red Men, Improved Order of, 3036a.
 Redmond, John Edward, 3036b.
 Redpoll, 2116b.
 Red River, 3036b.
 Red River of the North, 3036b.
 Red River Rebellion, 3037a.
 Red Root, 1586a.
 Red Sapphire, 3129a.
 Red Sea, 413b, 3037b.
 Red Spiders, 2372b.
 Redstart, 3037b, 3803b.
 Redwing, Minn., 3038a.
 Redwood, 3038a, 3256b.
 Reed, Thomas Brackett, 3038a.
 Reed Bird, 485b.
 Reelfoot Lake, 3542a.
 Referendum, 3038b.
 Reflecting Telescope, 3535b.
 Reflection of Light, 2101b.
 Reflex Action, 3038b.
 Reformation, The, 3039a.
 Reformed Church, 3042a.
 Reform Schools, 3042a.
 Refracting Astronomical Telescope, 3535b.
 Refraction, 3042b.
 Refraction of Light, 2102a.
 Refrigerator Cars, 3000b.
 Regattas, 2993b.
 Regelation, 3043a.
 Regent, 3043a.
 Regiment, 226b, 3043a.
 Regina, Sask., 3043a.
 Registered Bonds, 498a.
 Registration, 3043b.
 Registration of Births, Deaths, and Marriages, 3043b.
 Registration of Deeds, 1047b.
 Rehoboam, 419a.
 Reichstadt, Napoleon Francis, 3043b.
 Reichstag, 3044a.
 Reid, Whitelaw, 3044a.
 Reign of Terror, 3547a.
 Reikjavik, Iceland, 3058a.
 Reims, France, 3059a.
 Reindeer, 66a, 3044a.
 Reinforced Concrete, 908b.
 Relationship, 3045a.
 Relief, 102b, 359a, 2324a, 3229b.
 Relief Map, 2247a.
 Religion, 3045a.
 Religious Liberty, 3046a.
 Rembrandt, 3046b.
 Remington, Frederic, 3047a.
 Remsen, Ira, 3047a.
 Remus, 3099b.
 Renaissance, 3047b.

Renaissance Architecture, 166a.
 Renan, Ernest, 3049a.
 Renfrew, Ont., 3049a.
 Reni, Guido, 1591a.
 Rennin, 1075b.
 Reno, Nev., 3049a.
 Rensselaer, N. Y., 3049b.
 Rent, 3049b, 3794a.
 Reo Teodoro, 3112b.
 Replevin, 3949b.
 Reply to Hayne, 3840b.
 Repousse, 1219b.
 Representatives, House of, 3050a.
 Reprieve, 3051a.
 Reptiles, 3051b.
 Republic, 1542a.
 Republican Elephant, 2476a.
 Republican Party, 2889a, 3051b.
 Republican Party of 1801, 2887a.
 Republic of Panama, 2718b.
 Republic of Plato, 2871b.
 Repudiation, 3052a.
 Requiem, 2270a.
 Requisition (law), 1286b.
 Resaca de la Palma, Battle of, 3052a.
 Reservoir, 3052a.
 Residual Air, 549b.
 Resins, 3052b.
 Resolutions of 1798, 1941b.
 Restigouche River, 3052b.
 Restoration, The, 3052b.
 Resumption of Specie Payments, 3379a.
 Resurrection, 3053a.
 Resurrection Plant, 1887b.
 Reszke (family), 1061b.
 Retainer, 3053a.
 Retriever, 3053b.
 Reunion, Ile de la, 3053b.
 Reval, Esthonia, 3053b.
 Reveille, 592b.
 Revelation, Book of, 3053b.
 Revelstoke, B. C., 3054a.
 Revenue Cutter Service, 867a.
 Revenue Flag, 1341a.
 Revere, Paul, 3054b.
 Reveries of a Bachelor, 2372a.
 Review Roundel (game), 1439b.
 Revival of learning, 3047b.
 Revolution, 3054b.
 Revolutionary War in America, 3055a, 3702b.
 Revolver, 3057b.
 Rexford, Eben Eugene, 3058a.
 Reykjavik, Iceland, 3058a.
 Reynolds, Joshua, 2705b, 3058a.
 Rhadamanthus, 3058b.
 Rhaetians, 3489a.
 Rhea (bird), 3058b.
 Rhea (mythology), 3059a.
 Rheims, France, 3059a.
 Rhetoric, 3059b.
 Rheumatism, 3059b.
 Rhine River, 3060a.
 Rhinoceros, 3061a.
 Rhinoceros Bird, 3061b.
 Rhizopoda, 3061b.
 Rhode Island, 3061b.
 Rhodes, Cecil, 2694b, 3065a.
 Rhodes, Island of, 3064b.
 Rhodesia, 3065b.
 Rhodes Scholarships, 3066a.
 Rhododendron, 3066b.
 Rhomb Spar, 1092b.
 Rhombus, 3066b.
 Rhone River, 3066b.
 Rhubarb, 3067a.
 Ribbon, 3067a.
 Ribbon Fish, 3067a.
 Rib Grass, 2869b.
 Ribs, 3067b.
 Rice, 3067b.
 Rice, Alice Hegan, 3068b.
 Rice Bunting, 485b, 3069a.
 Rice Paper, 3069a.
 Richard I, 997b, 3069a.

Richard II, 3069a.
 Richard III, 3069b.
 Richardson, Samuel, 3069b.
 Richelieu, Armand Jean Du-plessis, 3070a.
 Richelieu River, 3070a.
 Richmond, Ind., 3070a.
 Richmond, Va., 3070b.
 Richter, Johann Paul Friedrich, 3072a.
 Rickets, 3072a.
 Riding, 3072b.
 Ridley, Nicholas, 3072b.
 Ridpath, John Clark, 3072b.
 Riel, Louis, 3073a, 3200a.
 Rienzi, Cola di, 3073b.
 Riesengebirge, 3073b.
 Rifle, 3073b.
 Riga, Gulf of, 3074b.
 Riga, Livonia, 3074b.
 Riggs, Kate Douglas Wiggin, 3075a.
 Right, Petition of, 2804a.
 Right and Wrong, 1259a.
 Right of Search, 3242a.
 Right of Way, 3075a.
 Rights, Bill of, 432b.
 Rigsdag, 1057b.
 Riis, Jacob Augustus, 3075a.
 Riley, James Whitcomb, 3075b.
 Rime of the Ancient Mariner, 878b.
 Rinderpest, 3076a.
 Rinehart, Mary Roberts, 3076a.
 Ring, 3076a.
 Ring and the Book, The, 574b.
 Ring-Toss, 182a.
 Ringworm, 3076b.
 Rio de Janeiro, Brazil, 3077a.
 Rio de la Plata, 3077b.
 Rio Grande, 3078a.
 Rio Negro, 3078a.
 Riot, 3078a.
 Riparian Rights, 3078a.
 Ripley, George, 3607b.
 Rip Van Winkle, 1846a, 3078b.
 Ristori, Adelaide, 3078b.
 Rivers, 3079a.
 Riverside, Calif., 3080a.
 Riverside Drive, 2556a.
 River Systems of North America, 2584b.
 River Tortoise, 3080a.
 Rives, Amelie, 3080b.
 Riviera, 3080b.
 Road Rules, 3081a.
 Road Runner, 3080b.
 Roads, 3081a, 3688a.
 Roanoke, Va., 3083a.
 Roanoke River, 3083a.
 Roaring Forties, 2937a.
 Roasting (cooking), 1099b.
 Robbery, 3083a.
 Robert II, 3224a.
 Robbia (family), 3083b.
 Roberts, Charles George Douglas, 3083b.
 Roberts, Frederick Sleigh, Earl Roberts, 3083b.
 Roberval, Sieur de, 668b.
 Robespierre, Maximilien Marie Isidore, 3084a.
 Robin, 3084b.
 Robin Hood, 1049b, 3085a.
 Robin Hood and the Stranger, 2052a.
 Robinson Crusoe, 3085a, 3249b.
 Rob Roy, 3085a.
 Robsart, Amy, 2081a.
 Robson, Mount, 561a, 3089a.
 Robusti, Jacopo, 3584b.
 Roc, 3085b.
 Rochambeau, Jean Baptiste Donatien de Vimeure, 3085b.
 Rochester, Minn., 3086a.
 Rochester, N. Y., 3086a.
 Rock, 1474a, 3086b.
 Rock-cork, 239b.
 Rockefeller, John D., 3087a, 3400a.
 Rockefeller Foundation, 3087a.

Rockefeller Institute for Medical Research, 3087b.
 Rocket, The, 2150a, 3421a.
 Rockford, Ill., 3087b.
 Rock Hill, S. C., 3088a.
 Rock Island, Ill., 3088a.
 Rock of Ages, 1750b.
 Rock of Chickamauga, The, 3567b.
 Rock Salt, 3175b.
 Rocky Mountain National Park, 2742b.
 Rocky Mountain Parks, 885b, 2743b.
 Rocky Mountains, 3088b.
 Rocky Mountain White Goat, 3089b.
 Rodentia, 3089b.
 Rodin, Auguste, 3090a.
 Roe, Edward Payson, 3090b.
 Roebing, John Augustus, 3090b.
 Roebuck, 3091a.
 Roentgen, Wilhelm Konrad, 3091b.
 Roentgen Rays, 3091b.
 Rogers, Randolph, 3092a.
 Rohlf, Anna Katharine Green, 3092a.
 Roland, 3092a.
 Roland de la Platiere, Madame, 3092b.
 Rolfe, John, 2878a, 3092b.
 Rolfe, William James, 3092b.
 Roll Brimstone, 559a.
 Roller, 3092b.
 Rollo Books, 3a.
 Roman Architecture, 164b.
 Roman Catholic Church, 3093a.
 Romance, 2616b, 3094a.
 Romance Languages, 3094b, 3189b.
 Roman Consul, 935b.
 Romanesque Architecture, 164b.
 Roman Mythology, 2448b.
 Roman Numerals, 3094b.
 Romanoff (dynasty), 3095a.
 Romans, Epistle to the, 3095b.
 Romanticism, 3095b.
 Roman Walls, 3095b.
 Roman Wormwood, 2998a.
 Rome, 3096a.
 Rome, History of, 3099b.
 Rome, Ga., 3106a.
 Rome, Modern, 3098a.
 Rome, N. Y., 3106a.
 Romeo and Juliet, 3106b.
 Romulus, 3099b, 3106b.
 Roof of the World, 3577b.
 Rook, 3108a.
 Rookwood Pottery, 3108a.
 Roosevelt, The, 2603b.
 Roosevelt Theodore, 2577b, 3108b.
 Roosevelt Dam, 1842b.
 Root (mathematics), 3115b.
 Root, Elihu, 2577b, 3115b.
 Root, George Frederick, 3115b.
 Roots, 3116a.
 Rope, 3116a.
 Roquer, Emma de, 647a.
 Rorqual, 3116b.
 Rosa, Monte, 3116b.
 Rosaceae, 3116b.
 Rosamond, 3117a.
 Rosario, Argentina, 3117a.
 Rosary, 3117a.
 Rose, 3117b.
 Rose Bay, 2653b.
 Rosebery, Archibald Philip Primrose, 3118a.
 Rosecrans, William Starke, 3118b.
 Rose Family, 522a, 3116b.
 Rosemary, 3118b.
 Rose of Jericho, 1887b.
 Rose of Sharon, 1683a.
 Roses, Wars of the, 3118b.

Rosetta Stone, 3119a.
 Rose Window, 3119a.
 Rosewood, 3119a.
 Rosin, 3052b, 3119b.
 Ross, Alexander, 3119b.
 Ross, Betsy, 3119b.
 Ross, James Clark, 3119b.
 Rossetti, Christina Georgina, 3120a.
 Rosetti, Gabriel Charles Dante, 3120a.
 Rossini, Gioachino Antonio, 3120b.
 Rostand, Edmond, 3120b.
 Roswell, New Mex., 3120b.
 Rot, 3121a.
 Rotation of Crops, 3121a.
 Rothschild (family), 3122a.
 Rotterdam, Netherlands, 3122b.
 Roubaix, France, 3122b.
 Rouble, 3129a.
 Rouen, France, 3122b.
 Rouge, 3123a.
 Rouget de l'isle, 2258b, 3123b.
 Rouge ét noir, 3123a.
 Rough-on-Rats, 139b.
 Rough Riders, 3110a, 3123b, 3375b, 3907a.
 Roulette, 3123b.
 Roumania, 3131a.
 Roundheads, 3123b.
 Round Table, 3124a.
 Round Towers, 3124a.
 Rousseau, Jean Jacques, 3124a.
 Rowing, 3124b.
 Rowland, Henry Augustus, 3125a.
 Royal, Mount, 2405a.
 Royal Gorge, 3125a.
 Royal. Institution. of. Great Britain, 3125a.
 Royal Northwest Mounted Police, 3125b.
 Royal Society, The 3126a.
 Royal Supremacy, 3475b.
 Rubaiyat, 1337a, 2657a.
 Rubber, 2489b, 3126b.
 Rubble Masonry, 2269b.
 Rubellite, 3602b.
 Rubens, Peter Paul, 2705b, 3128a.
 Rubicon River, 3128b.
 Rubidium, 3128b.
 Rubinstein, Anton Grigoryevitch, 3128b.
 Ruble, 3129a.
 Rubrics, 2246a.
 Ruby, 461a, 3129a.
 Rude, Francois, 3129a.
 Ruff, 3129a.
 Ruffo, Titti, 3129b.
 Rugby School, 3129b.
 Rugs, 3129b.
 Ruisdael, 3149a.
 Rule of Three, 2950a.
 Rulers of the World, 3131a.
 Rum, 3131a.
 Rumania, 3131a.
 Rumania in World War, 3922b.
 Rumelia, 3133b.
 Ruminants, 3133b.
 Rump Parliament, 992a, 3134a.
 Runes, 3134a.
 Runjit Singh, 3134a.
 Runnimeade, 3134b.
 Running Relay (game), 1441a.
 Rupee, 3134b.
 Rupert's Land, 3134b.
 Rupture, 1677b.
 Rural Credits, 3134b.
 Rural High Schools, 1685b.
 Rurik, 3142a.
 Rush, 3135b.
 Ruskin, John, 3136a.
 Russell, Annie, 3136a.
 Russell, John, 3136b.
 Russell, Lillian, 3137a.
 Russell, Sol Smith, 3137a.

Russell Sage Foundation, 3137a.
 Russia, 3137b.
 Russian Turkestan, 3648b.
 Russo-Japanese War, 3146b.
 Russo-Turkish War, 3147a.
 Rust, 3147b.
 Rusts, 3148a.
 Ruth, 414a.
 Ruth, Book of, 3148a.
 Ruthenians, 3148a.
 Rutile, 3148b.
 Rutland, Vt., 3148b.
 Rutledge, John, 3148b.
 Ruwenzori, Mount, 8a.
 Ruysdaal, Jacob van, 3149a.
 Ryan, Abram Joseph, 3149a.
 Rye, 3149a.
 Rye House Plot, 3149b.
 Ryswick, Treaty of, 3149b.

S

S, 3150a.
 Saar Coal Region, 1390a.
 Sabbath, 3150a.
 Sabbatical Year, 3150a.
 Sabine River, 3150b.
 Sabines, 3150b.
 Sabines, Rape of the, 3099b.
 Sable, 3150b.
 Sable Antelope, 137b.
 Sable Island, 3151a.
 Sabotage, 3151a.
 Sac, 3151b.
 Saccharin, 3151b.
 Sachs, Hans, 3151b.
 Sacrament, 3093a, 3151b.
 Sacramento, Calif., 3152a.
 Sacramento River, 3152b.
 Sacred College, 3152b.
 Sacred Grove, The, 2655b.
 Sacred Way, 3096b.
 Sacrifices, 3152b.
 Saddle, 3153a.
 Sadducees, 3153a.
 Sadowa, Battle of, 3153b.
 S. A. E. Formula, 1722a.
 Safe, 3153b.
 Safety Lamp, 1034a, 3153b.
 Safety Matches, 2279b.
 Safety Valve, 3154a.
 Safflower, 3154a.
 Saffron, 3154a.
 Safi, Ismail, 2795b.
 Sagas, 2611a, 3154b.
 Sage, 3154b.
 Sage, Margaret Olivia Slocum, 3155a.
 Sage, Russell, 3154b.
 Sagebrush, 3155a.
 Sagebrush State, 3155a.
 Sage Grouse, 3155a.
 Saghalien Island, 3170b.
 Saginaw, Mich., 3155a.
 Sagittarius, 3155b.
 Sago, 3155b.
 Saguenay River, 3156a.
 Sahara Desert, 3156a.
 Said Pasha, 1191b.
 Saiga, 137a.
 Saigon, Cochinchina, 3157a.
 Sailboat and Sailing, 3157a.
 Sailing Vessels, 3281b.
 Saint Albans, Battle of, 3118b.
 Saint Andrew's Cross, 994a.
 Saint Augustine, Fla., 3158b.
 Saint Bartholomew, Massacre of, 348a.
 Saint Bernard, Great, 3158b.
 Saint Bernard Dog, 3158b.
 Saint Basil, Order of, 275b.
 Saint Boniface, Man., 3159a.
 Saint Catharine's Ont., 3159a.
 Saint Charles, Mo., 3159b.
 Saint Christopher (island), 3159b.
 Saint Clair, Arthur, 3159b.
 Saint Clair, Lake, 3160a.

Saint Cloud, Minn., 3160a.
 Saint Croix Island, 3620b.
 Saint Elias Mountains, 3160a.
 Saint Elmo's Fire, 3160b.
 Saint Etienne, France, 3160b.
 Saint Francis Xavier, 3955a.
 Saint Gaudens, Augustus, 3160b, 3236a.
 Saint George, 1409b.
 Saint George, Order of, 2671a.
 Saint George and the Dragon, 3161a.
 Saint George's Channel, 3161a.
 Saint Gotthard, 3161b.
 Saint Helena Island, 3161b.
 Saint Hyacinthe, Que., 3161b.
 Saint John, Que., 3162b.
 Saint John, N. B., 3162a.
 Saint John of Jerusalem, Knights of, 1899b.
 Saint John River, 3162a.
 Saint John's, Newfoundland, 3162a.
 Saint John's River (Fla.), 3162b.
 Saint Joseph, Mo., 3162b.
 Saint Kitts, 3159b, 3621a.
 Saint Lawrence, Gulf of, 3163a.
 Saint Lawrence Canals, 678b.
 Saint Lawrence Islands Park, 2743a.
 Saint Lawrence River, 3163a.
 Saint Leger, Barry, 3163b.
 Saint Louis, Mo., 3164a.
 Saint Lucia Island, 3621b.
 Saint Mark, Cathedral of, 3166a.
 Saint Mary's Canal, 3202b.
 Saint Mary's River, 3166b.
 Saint Maurice River, 3166b.
 Saint Nicholas, a Visit from, 2020a.
 Saint Paul, 3167a.
 Saint Paul de Loanda, Angola, 3168b.
 Saint Paul's Cathedral, 3168b.
 Saint Petersburg, Fla., 3169a.
 Saint Petersburg, Russia, 2804b, 3169a.
 Saint Peter's Canal, 679b.
 Saint Peter's Church, 3169a.
 Saint Quentin, France, 3169b.
 Saint-Saens, Charles Camille, 3169b.
 Saint Sophia, Church of, 3169b.
 Saint Thomas, Ont., 3170a.
 Saint Thomas Island, 3170a.
 Saint Ursula, 3723a.
 Saint Ursula, Nuns of, 3723a.
 Saint Valentine, 3732b.
 Saint Veronica, 3761b.
 Saint Vincent, 3170b.
 Saint Vitus's Dance, 3170b.
 Sainte Anne de Beaupre', Quebec, 3160a.
 Sakhalin Island, 3147a.
 Saladin, 997b, 1191a, 3171a.
 Salamander, 3171a.
 Salamis, 3171b.
 Sal Ammoniac, 3171b.
 Salary Grab, 3171b.
 Salayer Islands, 3171b.
 Sale, 348a.
 Sale, Bill of, 432b.
 Salem, Mass., 3171b.
 Salem, Ohio, 3172a.
 Salem, Ore., 3172b.
 Saleyer Islands, 3171b.
 Salic Law, 3172b.
 Salicylic Acid, 3172b.
 Salina, Kans., 3173a.
 Salisbury, N. C., 3173a.
 Salisbury, Robert Arthur Talbot Gascoyne Cecil, 3173a.
 Saliva, 3173b.
 Sallust, 3173b.
 Salmon, 3174a, 3809b.
 Salol, 3175a.
 Salome, 3175a.
 Salon, The Paris, 3175a.

Saloniki, Greece, 3175a.
 Salsify, 2696a, 2697a.
 Salt, 3175b.
 Saltillo, Max, 3177a.
 Salt Lake City, Utah, 3177b, 3725a.
 Salt Lakes, 1468a.
 Salt Sea, 1037a.
 Salton Sea, 3178a.
 Saltpetre, 3178b.
 Salts, Smelling, 3178b.
 Salutations, 3178b.
 Salvador, 3178b.
 Salvation Army, 3179b.
 Salvini, Tommaso, 3180b.
 Samaria, 3180b.
 Samaritans, 3180b.
 Samarkand, Russian Turkestan, 3181a.
 Samen Mountains, 9b.
 Samnites, 3181a.
 Samoa, 3181a.
 Samos, 30a, 3181b.
 Sampson, William Thomas, 3181b.
 Sam Slick, 1614b.
 Samson, 3182a.
 Samson Agonistes, 3182a.
 Samson and Delilah, 3169b.
 Samuel, 3182b.
 Samuel, Books of, 3182b.
 Samurai, 3182b.
 San Angelo, Tex., 3182b.
 San Antonio, Tex., 3182b, 3552a.
 San Bernardino, Calif., 3183b.
 San Diego, Calif., 3184b.
 San Domingo, 3192a.
 Sand, 3183b.
 Sand, George, 3183b.
 Sandalwood, 3184a.
 Sand Bur, 3184a.
 Sand Eel, 3184a.
 Sanderling, 3184a.
 Sand Lance, 3184a.
 Sandpaper, 3184b.
 Sandpiper, 3185a.
 Sandstone, 3185a.
 Sand Table, 1978b.
 Sandusky, Ohio, 3185a.
 Sandwich Islands, 1643a.
 Sandy Hook, 3185b.
 San Francisco, Calif., 3185b.
 San Francisco River, 3187a.
 Sanhedrin, 3187b.
 Sanitary Science, 3187b.
 Sanitation, 1101a.
 San Jacinto, Battle of, 3183a, 3187b.
 San Joaquin River, 3188a.
 San Jose, Calif., 3188a.
 San Jose, Costa Rica, 3188a.
 San Jose Scale, 3188b.
 San Juan, Porto Rico, 3188b.
 Sankey, Ira David, 3188b.
 San Luis Park, 3088b.
 San Luis Potosi, Mex., 3189a.
 San Marino, Republic of, 3189a.
 San Martin, 3189a.
 San Miguel de Tucuman, Argentina, 3643a.
 San Salvador, Central America, 3189b.
 Sanskrit Language and Literature, 3189b.
 Santa Ana, Calif., 3190a.
 Santa Anna, Antonio Lopez de, 3190a.
 Santa Barbara, Calif., 3190a.
 Santa Claus, 2570a.
 Santa Cruz, Calif., 3190b.
 Santa Fe, Argentina, 3190b.
 Santa Fe, N. M., 3191a.
 Santiago, Chile, 3191b.
 Santiago, Battle of, 3191b.
 Santiago de Cuba, Cuba, 3192a.
 Santo Domingo, Santo Domingo, 3192a.
 Santos, Brazil, 3192b.
 Santos-Dumont, Alberto, 1362a, 3193a.

Saone River, 3193a.
 Sao Paulo, Brazil, 3193a.
 Sap, 3193b.
 Sapajou, 3193b.
 Sapphire, 361a, 3193b.
 Sappho, 3194a.
 Saprohytes, 314a.
 Sap-sucker, 1346b, 3194a, 3909a.
 Sapulpa, Okla., 3194b.
 Saracens, 1191a, 3194b.
 Saragossa, Spain, 3194b.
 Sarajevo, 3195a.
 Saratoga, Battles of, 1319b, 3195a.
 Saratoga Springs, N. Y., 3195b.
 Saratov, Russia, 3195b.
 Sarcolemma, 2438a.
 Sarcophagus, 875a, 3195b.
 Sard, 3196a.
 Sardanapalus, 257a, 3196a.
 Sardine, 3196a.
 Sardinia, 3196a.
 Sardinia, Kingdom of, 3196b.
 Sardonyx, 461a, 2662b, 3197a.
 Sardou, Victorien, 3197a.
 Sargasso Sea, 3197a.
 Sargent, John Singer, 3197a.
 Sargon II, 257a, 311b.
 Sarnia, Ont., 3197b.
 Sarpedon, 3197b.
 Sarsaparilla, 3197b.
 Sarto, Andrea del, 2704b, 3197b.
 Sartor Resartus, 705b.
 Saskatchewan, 3198a.
 Saskatchewan Rebellion, 3200a.
 Saskatchewan River, 3200b.
 Saskatoon, Sask., 3200b.
 Sassafras, 3201a.
 Satan, 1066a.
 Satellite, 3201a.
 Satin, 3201a.
 Satire, 3201b.
 Saturday, 3201b.
 Saturn (mythology), 3201b.
 Saturn (planet), 3201b.
 Saturnalia, 3202a.
 Satyrs, 3202a.
 Sauger, 2852a.
 Sauk Indians, 3151b.
 Saul, 2758a, 3202a.
 Sault Sainte Marie, Mich., 3202b.
 Sault Sainte Marie, Ont., 3202a.
 Sault Sainte Marie Canal, 3202b.
 Saunders, Margaret Marshall, 3203a.
 Sausage, 3203b.
 Savannah (ship), 3282b.
 Savannah, Ga., 3203b.
 Savannah River, 3204b.
 Saving and Spending, 3572a.
 Savings Bank, 3204b.
 Savings Bank, Canadian, 3205b.
 Savonarola, Girolamo, 3205b.
 Savoy, House of, 3206a.
 Saw, 3206a.
 Sawfish, 3206b.
 Saw Fly, 3207a.
 Saxe, John Godfrey, 3207a.
 Saxifrage, 3207a, 3386b.
 Saxons, 3207a.
 Saxony, Kingdom of, 3207b.
 Saxophone, 3208a.
 Scabies, 2236a.
 Scalds, 3216a.
 Scale Insect, 3208b.
 Scales (music), 2440a, 3208a.
 Scales (zoology), 3208b.
 Scallop, 3208b.
 Scalp, The, 3208b.
 Scammony, 3209a.
 Scandinavia, 3209a.
 Scandinavian Mythology, 2461b.
 Scapegoat, 3209a.
 Scapula, 3317b.
 Scarab, 3209a.
 Scarification, 3520a.

Scarlet Fever, 785a, 3209b. —
 Scarlet Letter, The, 1647a.
 Scheldt River, 3210a.
 Schenectady, N. Y., 3210a.
 Schiller, Johann Friedrich, 3210a, 3211a.
 Schist, 463b.
 Schleswig-Holstein, 3211a.
 Schley, Winfield Scott, 3211b.
 Schleyer, Johann Martin, 3787b.
 Schmalkaldic League, 3212a.
 Schoffer, Peter, 1598a.
 Schofield, John McAllister, 3212b.
 Scholasticism, 3212b.
 School, 3213b.
 School, Evening, 1280a.
 School, Parochial, 2749b.
 School, Vacation, 3731a.
 School District, 3212b.
 School Gardens, 1444b, 3212b.
 School Savings Banks, 3205a.
 Schopenhauer, Arthur, 3214b.
 Schorl, 3602b.
 Schottisch, 1025a.
 Schubert, Franz, 3215a.
 Schuckburgh, Richard, 3960a.
 Schumann, Robert, 3215b.
 Schumann-Heink, Ernestine, 3215b.
 Schurman, Jacob Gould, 3216a.
 Schurz, Carl, 3216a.
 Schuyler, Philip, 3216b.
 Schuylkill River, 3216b.
 Schwab, Charles M., 3216b.
 Schwatka, Frederick, 3217a.
 Sciatica, 3217a.
 Science, Christian, 814b.
 Science and Health with Key to the Scriptures, 1178a.
 Science and the Sciences, 3217a.
 Scilly Islands, 3217b.
 Scipio Africanus, 3217b.
 Scipio, Publius Cornelius Aemilianus, 3218a.
 Scissorsbill, 3218a.
 Sclerosis, 3218b.
 Sclerotic, 1287a.
 Scopas, 3231b.
 Scorpio, 3218b.
 Scorpion, 3218b.
 Scorpion Fish, 3219a.
 Scorpion Fly, 3219a.
 Scotch, 3220a.
 Scotch Terrier, 3219a.
 Scotch Verdict, 3219a.
 Scotia, 3223a.
 Scotland, 3219b.
 Scotland Yard, 3225b.
 Scots, 3220a.
 Scott, Hugh Lenox, 3226a.
 Scott, Robert Falcon, 3226a, 3367a.
 Scott, Thomas, 3073a.
 Scott, Walter, 2b, 3025b, 3226b.
 Scott, Winfield, 3227b.
 Scotti, Antonio, 3227b.
 Scottish Chiefs, 2909a.
 Scouring Rush, 1722b, 1723a.
 Scranton, Pa., 3227b.
 Scrap-Books (kindergarten), 1973b.
 Scrap-Books (primary dept.), 1978b.
 Screw, 3228a.
 Screw Pine, 3228b.
 Screw Propeller, 1823a.
 Scribe, Augustin Eugene, 3229a.
 Scrofula, 3229a.
 Scruple, 3229a.
 Sculpin, 3229a.
 Sculpture, 3229b.
 Sculpture, American, 3700a.
 Scurvy, 3238b.
 Scutari, Albania, 3238b.
 Scutum, 223a.
 Scylla and Charybdis, 3239a.
 Sea, 2631a.
 Sea Anemone, 3239a.

Sea Bear, 3240b.
 Sea Blubber, 1886b.
 Sea Cow, 2233b.
 Sea Cucumber, 3239a.
 Sea-Devil, 125a.
 Sea Horse, 1689a.
 Sea-Island Cotton, 969a.
 Sea Islands, 3239b.
 Sea Kale, 3239b.
 Seal (animal), 3240a.
 Seal (mark), 3241b.
 Sealing Wax, 3241b.
 Sea Lilies, 989b.
 Sea Lion, 3241b.
 Sea Necklaces, 907b.
 Sea Nettles, 1886b.
 Sea Onion, 3395b.
 Sea Otter, 2691a.
 Sea Raven, 3229a.
 Search, Right of, 3242a.
 Search Warrant, 3806a.
 Sea Robin, 1596b.
 Sea Serpent, 3242a.
 Seasickness, 3242a.
 Sea-snipe, 388a.
 Seasons, 3242b.
 Sea Squirts, 3242b.
 Seattle, Wash., 3243a.
 Seat Work, 1978a.
 Sea Unicorn, 2475a.
 Sea Urchin, 3244a.
 Sea Weed, 3244b.
 Sebaceous Glands, 1519a, 1610b, 3319b.
 Sebastian, Saint, 3244b.
 Sebastopol, Crimea, 3244b.
 Secession, 3244b.
 Secession in America, 3710b.
 Secondary Colors, 885a.
 Secondary Schools, 3214b.
 Second-Lieutenant, 2099a.
 Secord, Laura, 3245a.
 Secret Societies, 1404b.
 Secretary Bird, 3245a.
 Secretary of State, 3410a.
 Secretary of the Treasury, 3623b.
 Secretary of War, 225b.
 Secretion, 3245a.
 Secret Service, 3245b.
 Section, Division of a, 2013b.
 Secular Games, 3245b.
 Sedalia, Mo., 3245b.
 Sedan, Battle of, 3246a.
 Sedative, 3246a.
 Sedges, 3246a.
 Sedimentary Rocks, 1474a.
 Seed, 2490b, 3247a.
 Seed Dispersal, 3246b.
 Seeder, 3369a.
 Seedless Apples, 150a.
 Seed Testing, 3248a.
 Seeger, Alan, 3248a.
 Seidlitz Powders, 3248b.
 Seigniorage, 3248b.
 Seine, 3249a.
 Seismograph, 3249a.
 Selections for Memorizing, 2124a.
 Selene, 1225a, 3249a.
 Selenium, 3249a.
 Seleniureted Hydrogen, 3249b.
 Seleucus Nicator, 140b.
 Self-Activity, 2767a.
 Self-denying Ordinance, 992a, 3249b.
 Self-Dependence, 3873b.
 Self-Expression, 787b.
 Self-Reliance, 1263a.
 Self-Respect, 787b.
 Self-Restraint, 1262b.
 Seljuks, 3249b.
 Selkirk, Alexander, 1911b, 3085a, 3249b.
 Selkirk Mountains, 3250a.
 Selma, Ala., 3250a.
 Selvage, 858b.
 Selvas, 3250a.
 Semaphore, 3250a.
 Sembrich, Marcella, 3250b.
 Semele, 3250b.
 Seminole, 3251a.

Semiramis, 256b, 3251a.
 Semiramis of the North, 3251a.
 Semitic Group of Languages, 2821b.
 Semites, 3251a.
 Semitic Language, 3251b.
 Semmes, Raphael, 3251b.
 Senate, 3251b.
 Senate (Canada), 2744a.
 Senate of the United States, 3252a.
 Seneca, Lucius Annaeus, 3252b.
 Seneca Indians, 3252b.
 Seneca Lake, 3252b.
 Senegal, 3253a.
 Senegal River, 3253b.
 Senegambia, 3253a.
 Sennacherib, 311b, 3253a.
 Sensation, 3253a.
 Sense Games, 1955b.
 Senses, 2961b, 3254a.
 Sensitive Plant, 3254b.
 Sensory Nerves, 2508b.
 Sensuous Feelings, 1306a.
 Sentence, The Simple, 2047b.
 Sentimental Journey, 3422a.
 Seoul, Chosen, 3254b.
 Sepal, 1354a.
 Separatists, 2853a.
 Separator, Cream, 983b.
 Sepia, 3254b.
 Sepoy, 3254b.
 Sepoy Rebellion, 731b, 1784a, 3255a.
 Seppuku, 1627a.
 September, 3255a.
 Septennial Act, 1562a.
 Septimius Severus, Arch of, 3255b.
 Septuagint, 1894b, 3256a.
 Septum, 1656a.
 Sequoia, 3256a.
 Sequoia National Park, 2742b.
 Sequoyah, 103a, 769b.
 Seraglio, 3256b.
 Serajevo, Bosnia, 3195a.
 Serapis, The, 499a, 3057a, 3257a.
 Serbia, 3257a.
 Serfs, 3259a.
 Sergeant, 3259a.
 Sergeant-at-Arms, 3259a.
 Serinagur, Kashmir, 3259a.
 Serous Membranes, 3259b.
 Serpent, 3330b.
 Serpent Charming, 3259b.
 Serpentine, 3259b.
 Serum Therapy, 3259b.
 Serval, 3260a.
 Servetus, Michael, 647b, 3260a.
 Service, Robert William, 3260b.
 Servius Tullius, 3260b.
 Sesame Grass, 1436b.
 Seti I, 1190b, 3260b.
 Seton, Ernest Thompson, 536b, 3261a.
 Setter, 3261a.
 Seul, Chosen, 3254b.
 Seven Lamps of Architecture, The, 3136a.
 Seven Modern Wonders of the World, 3262a.
 Seven Pines, Battle of, 1294a.
 Seven Sleepers, 3261b.
 Seventeen-year Locust, 819b.
 Seventh Day Adventists, 3261b.
 Seven Times One, 2021a.
 Seven Weeks' War, 3153b, 3261b.
 Seven Wise Men of Greece, 3262a.
 Seven Wonders of the World, 3262a.
 Seven Years' War, 3262a.
 Severn River, 3263a.
 Severus, Lucius Septimius, 3263a.
 Seville, Spain, 3263a.
 Sevres Porcelain, 3263b.
 Sewerage, 2874b, 3264a.
 Seward, William Henry, 3264b.
 Sewing Machine, 1823a, 3256a.

Sextant, 3265b.
 Seymour, Jane, 1672a.
 Shackleton, Ernest, 3265b, 3367b.
 Shad, 3266a.
 Shadbush, 3386b.
 Shaddock, 1554b.
 Shad Fly, 2284b.
 Shadow, 2103b.
 Shafter, William Rufus, 3266b.
 Shaftesbury, Anthony Ashley Cooper, 3266b.
 Shagreen, 3266b.
 Shah, 645b.
 Shah Jehan, 3267a.
 Shakers, 3267a.
 Shakespeare, William, 3267b.
 Shaking Quakers, 3267a.
 Shale, 3270b.
 Shaler, Nathaniel Southgate, 3270b.
 Shamanism, 3271a.
 Shamokin, Pa., 3271a.
 Shamrock, 3271a.
 Shanghai, China, 3271a.
 Shannon, The, 3806a.
 Shannon River, 3271b.
 Shantung, 3271b.
 Shark, 3272a.
 Sharon, Pa., 3272b.
 Sharps and Flats, 2441a.
 Shasta, Mount, 640b, 3276b.
 Shasta Daisy, 1021b.
 Shat-el-Arab River, 1268a.
 Shaw, Albert, 3272b.
 Shaw, Anna, 3273a.
 Shaw, George Bernard, 3273a.
 Shawnee, Okla., 3273b.
 Shawnee Indians, 3273b.
 Shaw's Garden, 3164b.
 Shays, Daniel, 3273b.
 Shays' Rebellion, 3273b.
 Sheboygan, Wis., 3273b.
 Sheep, 3274a.
 Sheep Laurel, 1923b, 1924a.
 Sheephead, 3275a.
 Sheffield, Eng., 3275a.
 Sheik, 3275a.
 Shekel, 3275a.
 Shelbyville, Ind., 3275b.
 Sheldon, Charles Monroe, 3275b.
 Shell, 3276a.
 Shell (zoology), 3275b.
 Shelley, Percy Bysshe, 3276a.
 Shenandoah, Pa., 3277a.
 Shenandoah River, 3277a.
 Sheol, 1666a.
 Shepard, Finley J., 3277a.
 Shepard, Helen Gould, 3277a.
 Shepherd Dog, 3277a.
 Shepherd Kings, 1190b.
 Sheraton, Thomas, 1427b, 3277b.
 Sherbrooke, Que., 3277b.
 Shere Ali, 1784b.
 Sheridan, Philip Henry, 3277b.
 Sheridan, Richard Brinsley Butler, 3278a.
 Sheridan, Wyo., 3277b.
 Sheriff, 3278a.
 Sherman, James S., 3499b.
 Sherman, John, 3278b.
 Sherman, Roger, 3278b.
 Sherman, Tex., 3279a.
 Sherman, William Tecumseh, 3279a.
 Sherman Anti-Trust Law, 3642a.
 Sherman Silver Purchase Act, 3713a.
 Sherry, 3279b.
 She Stoops to Conquer, 1533b.
 Shetland Islands, 3279b.
 Shield, 3280a.
 Shiites, 3280a.
 Shillaber, Benjamin Penhallow, 3280a.
 Shilling, 3280b.
 Shiloh, 3280b.
 Shiloh, Battle of, 3280b.
 Shingles, 3281a.

Shinney, 1703b.
 Shintoism, 3281a.
 Ship, 3281a.
 Ship Broker, 569a.
 Shiraz, Persia, 3286b.
 Shittim Wood, 3286b.
 Shoddy, 29a, 3287a.
 Shoes, 506a.
 Shoestring Republic, 793b.
 Shogun, 1977a, 3287a.
 Sholes, Charles L., 1823a.
 Shooting Star, 2310b.
 Short Ballot, 3287a.
 Shorthand, 2860a, 3287b.
 Shorthorns, 728b.
 Short-tailed Field Mouse, 3789a.
 Shoshonean Indians, 3288b.
 Shoshone Falls, 3288b.
 Shoshone River, 3331a.
 Shot, 3288b.
 Shotgun, 3289a.
 Shot Put, 274a, 3289a.
 Shovelboard, 3291a.
 Shoveler, 1150a, 3289b.
 Shrapnel, 3289b.
 Shrapnel, Henry, 3290a.
 Shreveport, La., 3290a.
 Shrew, 3290a.
 Shrew Mole, 3290b.
 Shrike, 3290b.
 Shrimp, 3291a.
 Shrove Tuesday, 2250b, 3291a, 3643b.
 Shuffleboard, 3291a.
 Shuster, W. Morgan, 2796a.
 Shwanpan, 2a.
 Siam, 3291b.
 Siberia, 3293a.
 Sibyl, 3295b.
 Sibylline Books, 3295b.
 Sicilian Vespers, 3295b.
 Sicilies, Kingdom of the Two, 3296a.
 Sicily, 3296b.
 Sickle, 3297a.
 Siddons, Sarah Kemble, 3297a.
 Sidereal Month, 2404b.
 Sidereal Time, 3297b.
 Siderite, 1837b.
 Sidney, Philip, 3297b.
 Sidon, 3297b.
 Sidonians, 2824a.
 Siege, 3298a.
 Sienkiewicz, Henryk, 3298a.
 Sierra, Leone, 3298b.
 Sierra Madre Mountains, 3298b.
 Sierra Nevada Mountains, 3299a.
 Sierras, 3370b.
 Sigel, Franz, 3299a.
 Sighs, Bridge of, 557b.
 Sight, 3783a.
 Sigismund I, 2883b, 3299b.
 Sigma Xi, 3299b.
 Signal Corps, 226a, 3299b.
 Signaling, 3300b.
 Sign Language, 3301b.
 Sigsbee, Charles D., 3302a.
 Sigurd, 3302a.
 Sikhs, 1780b, 3302b.
 Si Kiang River, 3302b.
 Silage, 3307b.
 Silas Marner, 1213b, 2129b.
 Silence, Towers of, 3604a.
 Silesia, 3302b.
 Silica, 3303a.
 Silicon, 3303b.
 Silk, 3303b.
 Silk, Artificial, 3306a.
 Silkworm, 3303b.
 Silkworm Gut, 3306b.
 Siloam, Pool of, 3306b.
 Silo and Silage, 3306b, 3307b.
 Silurian Period, 3307b.
 Silver, 3308a, 3678a.
 Silver Certificates, 2386a.
 Silver State, 2519a.
 Simcoe, John Graves, 3309b.
 Similarity, Law of, 2296a.
 Simile, 1321a, 3309b.
 Simonides, 31b, 3309b.

Simon Peter, 2802a.
 Simons, Menno, 2298b.
 Simoon, 3310a.
 Simplon Pass, 3310a.
 Simplon Tunnel, 3310a.
 Simpson, James Y., 123b, 809b, 3310a.
 Sims, William Sowden, 3310b.
 Sinai, Mount, 3310b.
 Sinclair, Upton, 3310b.
 Sindia, 3311a.
 Sinding, Christian, 3311a.
 Singapore, 3311a.
 Singing, 3311a.
 Single Tax, 3311b.
 Sing Sing, N. Y., 2686b.
 Sinn Fein, 1564b, 1834b, 3312b.
 Sinusoidal Current, 1209a.
 Siouan Indians, 3312b.
 Siout, Upper Egypt, 3315a.
 Sioux City, Iowa, 3313a.
 Sioux Falls, S. D., 3313b.
 Sioux Indians, 3313a.
 Siphon, 3313b.
 Sir (title), 3314a.
 Siren, 3314a.
 Sir Galahad, 3547a.
 Sirius, 1089a, 3314a.
 Sirocco, 3314b.
 Sir Roger de Coverley, 23b.
 Sir Tristram, 3223a.
 Sisal, 433a, 3314b.
 Sisters of Charity, 751b.
 Sisters of Mercy, 2305b.
 Sistine Chapel, 3314b.
 Sistine Madonna, 770a, 2215a, 2705a, 3009b.
 Sisypheus, 3315a.
 Sitka, Alaska, 3315a.
 Sitting Bull, 3315a.
 Siut, Upper Egypt, 3315a.
 Siva, 3315b.
 Six Nations, The, 1338a.
 Six Per Cent Method, 1816b.
 Sixtus (Popes), 3315b.
 Skagerrak, 3315b.
 Skagway, Alaska, 3316a.
 Skalds, 2610b, 3316a.
 Skat, 3316a.
 Skate, 3316a.
 Skates and Skating, 3316b.
 Skeat, Walter William, 3316b.
 Skee, 3319a.
 Skeena River, 561b.
 Skeleton, The, 3317a.
 Skepticism, 3319a.
 Ski, 3319a.
 Skimmer, 3218a.
 Skin, 3319a.
 Skin Grafting, 3319b.
 Skink, 3319b.
 Skinner, Otis, 3320a.
 Skip Jack, 854b.
 Skua, 3320a.
 Skull, 3317a.
 Skunk, 3320a.
 Skupshtina, 3258a.
 Skye, Island of, 3320b.
 Skylark, 2060b.
 Skye Terrier, 3320b.
 Sky-scraper, 162b.
 Slag, 3320b.
 Slander, 2094a, 3320b.
 Slang, 3321a.
 Slate, 3321b.
 Slate Pencils, 2772a.
 Slavery, 3321b.
 Slavery in the United States, 3710a.
 Slavonia, 990a.
 Slavs, 3322b.
 Sleep, 275a, 3323a.
 Sleeping Beauty, 2791a.
 Sleeping Car, 3000a.
 Sleeping Sickness, 3323a, 3642a.
 Sleeplessness, 1812a.
 Sleepwalking, 3345a.
 Slidell, John, 3323b, 3631b.
 Slime Molds, 3323b.
 Sling, 3323b.
 Slipperwort, 635a.

Sloe, 3324a.
 Sloth, 3324a.
 Slot Machine, 3324b.
 Slovaks, 3324b.
 Slovenians, 3325a.
 Sloyd System, 2245a, 3325a.
 Slug, 3325a.
 Small Circle, 3383b.
 Small-Pox, 785a, 1886b, 3325a.
 Smell, 2843a, 3325a.
 Smelling Salts, 3178b, 3325b.
 Smelt, 3326a.
 Smetana, Friedrich, 3326a.
 Smilax, 3326a.
 Smiles, Samuel, 3326a.
 Smith, Adam, 3326b.
 Smith, Edmund Kirby, 3326b.
 Smith, Francis Hopkinson, 3326b.
 Smith, Goldwin, 3327a.
 Smith, Hyrum, 2413b.
 Smith, John, 2878a, 3327a.
 Smith, Joseph, 2413a, 3327b.
 Smith, Samuel, 110a, 3327b.
 Smith, Sophia, 3328a.
 Smith, Sydney, 3327b.
 Smith College, 3328a.
 Smith-Hughes Act, 1686a.
 Smith's Falls, Ont., 3328a.
 Smithson, James, 3328b.
 Smithsonian Institution, 3328a.
 Smoke, 3328b.
 Smokeless Powder, 3329a.
 Smollett, Tobias George, 3329a.
 Smoot, Reed, 3329b.
 Smuggling, 3329b.
 Smuts, 3329b.
 Smyrna, 3330a.
 Snail, 2488b, 3330a.
 Snake, 3330b.
 Snake Bird, 1030a, 3950b.
 Snake Charming, 3259b.
 Snake Dance, 1717b.
 Snake Indians, 3288b.
 Snake Killer, 3081a.
 Snake River, 3331a.
 Snap Dragon, 3331a.
 Snapping Turtle, 3080a, 3331a.
 Snipe, 3331b.
 Snoring, 3331b.
 Snorra Edda, 2611a.
 Snorri Sturluson, 3331b.
 Snout Beetle, 1008b.
 Snow, 1469b, 3332a.
 Snowball, 3332b.
 Snowberry, 3332b.
 Snowbird, 3332b.
 Snowbound, 3869a.
 Snowbunting, 3332b.
 Snowdrop, 3332b.
 Snow Leopard, 2691b.
 Snow Line, 3332b.
 Snowplow, 3332b.
 Snowshoe, 3333a.
 Snowstorm in the Country, 3558a.
 Snowy Heron, 1679a.
 Snuff, 3333a.
 Soap, 3333b.
 Soapstone, 3334a.
 Soccer Football, 1371b.
 Social Democrats, 3334a.
 Socialism, 3334b.
 Socialist Party, 2891a.
 Social Settlements, 3335b.
 Society for the Prevention of Cruelty to Animals, 3336b.
 Society Islands, Archipelago, 3336a.
 Society of Friends, 2978a.
 Society of Jesus, 1890b.
 Sociology, 3336b.
 Socrates, 3337a.
 Soda, 3337a.
 Soda Ash, 3337b.
 Soda Water, 3337b.
 Sodium, 3337b.
 Sodium Bicarbonate, 3337b.
 Sodom, 3338a.
 Sodom, Apples of, 3338a.
 Soerabaya, Java, 3476b.
 Sofia, Bulgaria, 3338a.

Soft Palate, 541b, 2711b.
 Soft-shelled Turtle, 3080a.
 Sohn, 2467b.
 Soil, 3338b.
 Soils, Bureau of, 51a.
 Soil Water, 3339a.
 Soissons, France, 3340b.
 Sokoto, Nigeria, 3340b.
 Solanum, 2573a, 3340b.
 Solar Engine, 3340b.
 Solar Microscope, 3341a.
 Solar Plexus, 2510a.
 Solar Spectrum, 2103a.
 Solar System, 3341a.
 Solders, 3341b.
 Soldiers, Homes for, 2014a, 3341b.
 Soldiers' and Sailors' Insurance, 1815a.
 Sole, 3342a.
 Solemn League and Covenant, 977a.
 Solicitor, 3342a.
 Solid, 3342b.
 Solidification, 2294b.
 Solitaire, 3342b.
 Solomon, 3342b.
 Solomon Islands, 3343a.
 Solomon's Song, 3343a.
 Solomon's Temple, 3537a.
 Solon, 3343a.
 Solstice, 1469a, 3343b.
 Solution, 3343b.
 Solvent, 3343b.
 Solway Firth, 3344a.
 Solyman II, 3344a.
 Somali Coast, 3344b.
 Somaliland, 3344a.
 Somers Islands, 398b.
 Somerville, Mass., 3344b.
 Somme, Battles of the, 3345a, 3921b.
 Somme River, 3345a.
 Somnambulism, 3345a.
 Somnus, 3345b.
 Sonata, 3345b.
 Song of Songs, 3343a.
 Song of the Lark, 552a.
 Sonnet, 3345b.
 Sons of Daniel Boone, 536b.
 Sons of Liberty, 3346a.
 Sons of Veterans, 3346a.
 Soot, 3346b.
 Sophia, Church of Saint, 3169b.
 Sophia, Bulgaria, 3338a.
 Sophists, 3346b.
 Sophocles, 3346b.
 Soprano, 3311b.
 Sorbonne, 3347a.
 Sorel, Que., 3347a.
 Sorghum, 3347b, 3465a.
 Sorority, 3347b.
 Sorrel, 3347b.
 Sorrel Tree, 3347b.
 Sothorn, Edward H. 3348a.
 Soudan, 3460b.
 Soul, 3348a.
 Sound, 3348a.
 Sounding, 3349a.
 Sounds, Classification of, 2681b.
 Soup-making, 1100b.
 Sour Gum, 465a.
 Sousa, John Philip, 3349b.
 South African War, 3349b.
 South America, 3350b.
 South-American Washington, 490b.
 Southampton, Eng., 3356b.
 South Australia, 3358a.
 South Bend, Ind., 3358b.
 South Bethlehem, Pa., 3358b.
 South Carolina, 3359a.
 South Carolina, University of, 3362a.
 South Dakota, 3362b.
 South Dakota, University of, 3365b.
 Southern Cross, 3366a.
 Southern Ocean, 136b.
 Southey, Robert, 3366a.

South Island, N. Z., 2563a.
 South Mountain, Battle of 3366a.
 South Orange, N. J., 2668a.
 South Polar Exploration, 3366b.
 South Sea Company, 3368b.
 Sovereign, 3368b.
 Sovereign of the Seas, 3282a.
 Sovereignty, 3368b.
 Soviet, 3130a, 3369a.
 Sowing Machine, 3369a.
 Sow Thistle, 3369b.
 Soy Bean, 367b, 3369b.
 Spaghetti, 2197a.
 Spain, 3370a.
 Spaniel, 1089b, 3374b.
 Spanish-American War, 3375a, 3713b.
 Spanish Colonies, 883a.
 Spanish Influenza, 1801a.
 Spanish Succession, War of the, 3458b.
 Spar Buoys, 602a.
 Sparling, 3326a.
 Sparrow, 3376a.
 Sparrow Hawk, 3376b.
 Sparta, 3376b.
 Sparticans, 3377b.
 Spartacus, 3377b.
 Spartanburg, S. C., 3378a.
 Spasm, 3378a.
 Spathic Ore, 1837b.
 Spavin, 3378a.
 Spawn, 3378a.
 Speaker, 3378b.
 Spearmint, 3378b.
 Special Senses, 3254a.
 Specie Circular, 1864a, 3736b.
 Specie Payments, Resumption of, 3379a.
 Species, 3379a.
 Specific Gravity, 1556a.
 Specific Gravity, Unit of, 3670b.
 Specific Heat, 3564a.
 Spectacled Snake, 868b.
 Spectacles, 3379a.
 Spectator, The, 23b.
 Spectroscope, 3379b.
 Spectrum, 2101a, 2103a.
 Spectrum Analysis, 3380a.
 Spectral Metal, 570a.
 Specular Iron Ore, 1837a.
 Speech, 3380b.
 Speedometer, 3380b.
 Speedwell, 2284b, 2876a.
 Spelling, 3380b.
 Spelter, 3377b.
 Spencer, Herbert, 3381b.
 Spencer Gulf, 3382b.
 Spenser, Edmund, 3382b.
 Spermaceti, 3383a, 3384b.
 Spermatophytes, 2808a.
 Sperm Oil, 3383a.
 Sperm Whale, 3383a.
 Sphere, 209b, 3383a.
 Spheroid, 3383b.
 Sphinx, 3383b.
 Sphinx Moth, 3383b.
 Sphygmograph, 3383b.
 Spice, 3384a.
 Spice Islands, 2381b.
 Spider, 3384a.
 Spider, Trapdoor, 3611a.
 Spider Web, 2488b, 3384b.
 Spiegeleisen, 3418b.
 Spikenard, 3385a.
 Spinach, 3385b.
 Spinal Cord, 2508a, 3385b.
 Spineless Cactus, 629a.
 Spinneret, 3304a.
 Spinning, 3385b.
 Spinning Jenny, 218b, 1628b, 3386a.
 Spinning Wheel, 3386a.
 Spinoza, Baruch Benedict, 3386b.
 Spiny Ant-eater, 1172b.
 Spiraea, 3386b.
 Spire, 3387a.
 Spirillum, 314b.
 Spirits of Turpentine, 3655a.

Spirits of Wine, 76a.
 Spiritualism, 3387a.
 Spirometer, 3387b.
 Spithead, 3387b.
 Spitz, 3387b.
 Spitzbergen Islands, 3388a.
 Spleen, 5b, 3386a.
 Splicing, 3388a.
 Spofford, Ainsworth Rand, 3388b.
 Spokane, Wash., 3388b.
 Sponge, 3389b.
 Spontaneous Combustion, 897a, 3390a.
 Spontaneous Generation, 3390a.
 Spoonbill, 3289b, 3390b.
 Spore, 3390b.
 Spotted Fever, 3663b.
 Spottiswood, Lady John Scott, 129b.
 Spottsylvania Court House, 3390b.
 Sprain, 3391a.
 Sprat, 3391a.
 Spring (astronomy), 3391b.
 Spring (physics), 3391b.
 Spring, Mineral, 2345a.
 Springbok, 3392a.
 Springer, 158a.
 Springfield, Ill., 3392a.
 Springfield, Mass., 3392b.
 Springfield, Mo., 3393a.
 Springfield, Ohio, 3393b.
 Springing Beetle, 854b.
 Spruce, 3393b.
 Spurge Family, 3394a.
 Spurgeon, Charles Haddon, 3394a.
 Spy, 3394b.
 Squad, 226b.
 Squadron, 3394b.
 Square, 3395a.
 Square Measure, 2315a, 3395a.
 Square Root, 206b.
 Squash, 3395a.
 Squash Bug, 3395b.
 Squatter Sovereignty, 1108a, 3395b.
 Squid, 3395b.
 Squill, 3395b.
 Squinting, 3396a.
 Squirrel, 3396a.
 Squirrel Game, 1439a.
 Srinagar, Kashmir, 3259a.
 Stabat Mater, 1157b, 3120b, 3396b.
 Stabiae Vesuvius, 2897a.
 Stable, 1020b.
 Stadium, 3396b.
 Stadtholder, 3397a.
 Staël, Madame de, 3397a.
 Staff, 3397b.
 Stag, 3397b.
 Stag Beetle, 3398a.
 Staggerbush, 1924a.
 Staghound, 3398a.
 Stained Glass, 3398a.
 Staked Plain, 3549b.
 Stalactite, 3398b.
 Stalagmite, 3398b.
 Stamens, 519a, 1354a.
 Stamford, Conn., 3398b.
 Stammering, 3399a.
 Stamp, 3399a.
 Stamp Act, 3399a.
 Stamp Weed, 1791a.
 Standard Oil Company, 3399b.
 Standards, Bureau of, 3400a.
 Standard Time, 3401a.
 Standish, Miles, 976b, 3402b.
 Stanford, Leland, 3403a.
 Stanislas Augustus, 2884a.
 Stanley, Henry M., 2144b, 3403a.
 Stanovoi Mountains, 3403b.
 Stanton, Edwin McMasters, 3404a.
 Stanton, Elizabeth Cady, 3404a, 3905b.
 Stanton, Frank Lebby, 3404b.
 Star, 266a, 2837a, 3406b.
 Starch, 3404b.

Star Chamber, 3405a.
 Starchy Foods, 1100b.
 Starfish, 3405a.
 Stark, John, 3405b.
 Starling, 3406a.
 Star-Nosed Mole, 3406a.
 Star of Bethlehem, 3406a.
 Starr, Ellen Gates, 22b, 1734b.
 Star Route, 3406a.
 Star Route Frauds, 3406a.
 Star-Spangled Banner, 1341a, 3407a.
 Starvation, 3407b.
 State, 3408a.
 State, Department of, 3410a.
 State, Secretary of, 3410a.
 State Banks, 334a.
 State Courts, 975b.
 State Flowers, 1355b.
 State Governments, 3694b.
 Staten Island, 3410a.
 States-General, 3410b.
 States of the Church, 2726b.
 States of the Union, 3696a.
 State Soldiers' Homes, 3342a.
 States Relations Service, 51b.
 States' Rights, 3410b.
 Statics, 1159a, 3410b.
 Statistics, 3410b.
 Statistics, Vital, 2905b.
 Statuary Bronze, 570a.
 Statuary Hall, 3411a.
 Statue, 3229b.
 Statute, 3411b.
 Statutory Law, 2066b.
 Staunton, Va., 3411b.
 Stead, William Thomas, 3411b.
 Steam, 2836b, 3412a.
 Steam Engine, 3412b.
 Steam Hammer, 2476a, 3415b.
 Steamship, 1823a, 3283a.
 Steam Shovel, 3416a.
 Steam Turbine, 1823a, 3647b.
 Stearic Acid, 3416a.
 Stearin, 3416a.
 Steatite, 3334a, 3505a.
 Stedman, Edmund Clarence, 3416b.
 Steel, 3416b, 3686b.
 Steel Corporation, United States, 3719a.
 Steel Pens, 2771a.
 Steelyard, 3419a.
 Steen, Jan, 3419b.
 Steenbock, 1753b.
 Stefansson, Vilhjalmur, 2606a, 3419b.
 Steffens, Lincoln, 3419b.
 Stegomyia Mosquito, 2422a.
 Steinbock, 137a, 3420a.
 Steinmetz, Charles P., 3420a.
 Stems, 3420a.
 Stencil, 3420a.
 Stenography, 3287b.
 Stephen, 3420b.
 Stephens, Alexander H., 3420b.
 Stephenson, George, 2150a, 3421a.
 Stephenson, Robert, 3421a.
 Steppes, 3421b.
 Stereopticon, 2218a.
 Stereoscope, 3421b.
 Stereotyping, 3421b.
 Sterlet, 3453a.
 Sterling, Michael, 3571b.
 Sterne, Laurence, 3422a.
 Sternum, 3317a.
 Sterope, 2872b.
 Stethoscope, 3422a.
 Stettin, 3422a.
 Steuben, Friedrich Wilhelm August, 3422b.
 Steubenville, Ohio, 3422b.
 Stevens, John F., 2722b, 3294a.
 Stevens, Thaddeus, 3422b.
 Stevenson, Adlai Ewing, 3423a.
 Stevenson, Robert Louis, 144b, 3423a.
 Stevens Point, Wis., 4323b.
 Stewart (family), 3451b.
 Stibnite, 3424a.

Stickleback, 3424a.
 Stigma, 1354a.
 Stikine River, 561b, 3424a.
 Still, 3861b.
 Stillwater, Minn., 3424a.
 Stilt, 3424b.
 Stilts, 3424b.
 Sting Ray, 3424b.
 Stink Weed, 3447a.
 Stoat, 1252a.
 Stock, 3424b.
 Stockbridge Indians, 2378a.
 Stock Broker, 569a.
 Stock Exchange, 3425b.
 Stockholder, 964b.
 Stockholm, Sweden, 3426a.
 Stockton, Calif., 3426a.
 Stockton, Francis R., 3426b.
 Stoddard, Richard Henry, 3426b.
 Stoicism, 3427a.
 Stomach, 2843b, 3427a.
 Stone, 3086b.
 Stone Age, 3427b.
 Stone Chat, 3427b.
 Stone, Harlan Fiske, 3427b.
 Stonehenge, 3428a.
 Stone Mountain, 509a, 3428a.
 Stone Pavement, 2759a.
 Stone River, 2436a.
 Stone River, Battle of, 2436a.
 Stones, Building, 3678b.
 Stones, Precious, 2930b.
 Stoneseed, 1586a.
 Stones of Venice, 3136a.
 Stonewall Jackson, 1865a.
 Stoneware, 2925b.
 Stony Point, N. Y., 3428a.
 Storage Battery, 1198a.
 Stories, Acting, 2025a.
 Stork, 3428b.
 Storms, 3428b.
 Storthing, 2611a.
 Story-Telling, 1956a, 3429b.
 Stoss, Veit, 3445b.
 Stove, 3445b.
 Stowe, Harriet Elizabeth Beecher, 3446a.
 Strabo, 3446a.
 Strabismus, 3396a.
 Stradivarius, Antonio, 3446b.
 Strafford, Thomas Wentworth, 3446b.
 Straits Settlements, 3446b.
 Stramonium, 3447a.
 Strassburg, Alsace-Lorraine, 3447a.
 Strassburg Clock, 3447a.
 Strategy, 3447b.
 Stratford, Ont., 3447b.
 Stratford-Upon-Avon, Eng., 3448a.
 Strathcona and Mount Royal, Donald Alexander Smith, 3448a.
 Stratified Rocks, 1474a, 3448b.
 Straus, Simon W., 3575b.
 Strauss, Johann, 3448b.
 Strauss, Richard, 3448b.
 Straw, 3448b.
 Strawberry, 3449a.
 Streator, Ill., 3449b.
 Street, 3081a.
 Street Railway, 3449b.
 Strength of Materials, 3450a.
 Stress, Unit of, 3450b.
 Striated Muscular Tissue, 2438a.
 Strike, 3451a.
 Strindberg, August, 3451a.
 Stripe-bellied Tunny, 499b.
 Strontium, 3451b.
 Strychnine, 139b, 3451b.
 Strychnos, 3451b.
 Stuart (family), 3451b.
 Stuart, Charles Edward, 3452a.
 Stuart, Gilbert, 3452a.
 Stuart, James Edward, 3452b.
 Stuart, James Ewell Brown, 3452b.
 Stuart, Ruth McEnery, 3452b.

Stucco, 3453a.
 Students' Army Training Corps, 3786b.
 Study of Authors, 3015a.
 Sturgeon, 3453a.
 Sturm, Johannes, 3453a.
 Stuttering, 3399a.
 Stuttgart, Germany, 3453b.
 Stuyvesant, Peter, 3453b.
 Style (botany), 1354a.
 Styptic, 3454a.
 Styx, 3454a.
 Sublime Porte, 925a.
 Submarine, 1823a, 3454a.
 Submarine Cable, 1823a.
 Submarine Mine, 3456b.
 Submarine Warfare, 3924a.
 Subornation of Perjury, 2790a.
 Subpoena, 3457b, 3903a.
 Subsidiary Motion, 2748b.
 Subsidy, 3458a.
 Subtraction, 174a.
 Subvocal, 2683a.
 Subway, 3458a.
 Succession to the Presidency, 2934b.
 Succession Wars, 3458b.
 Succory, 782a.
 Sucker, 3460a.
 Sucre, Bolivia, 3460a.
 Suction Pump, 2969a.
 Sudan, The, 3460b.
 Sudan Grass, 3461a.
 Sudermann, Hermann, 3461a.
 Sudoriferous Glands, 1519a.
 Sue, Marie Joseph Eugene, 3461a.
 Suez, Egypt, 3461b.
 Suez Canal, 3461b.
 Suffolk Resolves, 3806b.
 Suffrage, 3462a.
 Sugar, 3462b.
 Sugar Berry, 2517a.
 Sugar Cane, 3465b.
 Sugar of Lead, 2070a.
 Sugar Pine, 2855b.
 Suicide, 3466a.
 Suleiman II, 3344a.
 Sulla, 3102a, 3466b.
 Sullivan, Arthur Seymour, 3466b.
 Sully's Hill National Park, 2743a.
 Sulphates, 3467a.
 Sulphite of Soda, 28b.
 Sulphonal, 140a.
 Sulphur, 1806b, 3467a.
 Sulphureted Hydrogen, 3468a.
 Sulphuric Acid, 3468a.
 Sultan, 3468b.
 Sulu Islands, 2815b, 3468b.
 Sumac, 3469a.
 Sumatra, 3469a.
 Summer, 3469b.
 Summer Solstice, 1166b, 3242b.
 Summer Vacation for Schools Should be Abolished (theme) 3560a.
 Summer Yellow Bird, 3803a.
 Summons, 3949b.
 Summons, Writ of, 2945b.
 Sumner, Charles, 3469b.
 Sumptuary Laws, 3470a.
 Sumter, S. C., 3470a.
 Sun, 3470b.
 Sun, Spots on the, 267a.
 Sunbury, Pa., 3471b.
 Sunda Islands, 3471b.
 Sun Dance, 3471b.
 Sunday, 3150a.
 Sunday, William Ashley, 3472a.
 Sunday School, 2998a, 3472a.
 Sunderland, 3472b.
 Sundew, 3472b.
 Sun Dial, 858a, 3472b.
 Sunfish, 3473a.
 Sunflower, 3473a.
 Sunflower State, The, 1926a.
 Sun Motor, 3340b.
 Sunshine State, 3362b.
 Sunstroke, 3473a.
 Sun Yat Sen, 804b.

Superdreadnaught, 2496b.
 Superior, Lake, 3473b.
 Superior, Wis., 3474a.
 Superior Conjunction, 917a.
 Supernaturalism, 3474a.
 Superstition, 3474a.
 Supervisor, 3474b.
 Supper at Emmaus, The, 3047a.
 Supply and Demand, 3475a.
 Supremacy, Royal, 3475b.
 Supreme Court of Canada, 3475b.
 Supreme Court of the United States, 975a, 3475b.
 Surabaya, Java, 3476b.
 Surface Measure, 2315a.
 Surgeon Bird, 1859a.
 Surgery, 3476b.
 Surinam, 1157a.
 Surrogate, 3477b.
 Surrogate Court, 2945b.
 Surveying, 3478a.
 Survey of Land, 2012a, 2013a.
 Susa, Persia, 3478a.
 Suspension Bridge, 556b.
 Susquehanna River, 3478b.
 Sutherland, George, 3478b.
 Sutlej River, 3478b.
 Sutte, 3478b.
 Swallow, 3478b.
 Swallowing, 3479a.
 Swamp, 2259a.
 Swamp Sassafras, 2220b.
 Swan, 3479a.
 Swanee River, 1385b.
 Swayne, Charles, 1775b.
 Sweat, 2797b.
 Sweat Glands, 3319b.
 Sweatshop System, 3479b.
 Sweden, 3480a.
 Swedenborg, Emanuel, 3483b.
 Swedenborgians, 3483a.
 Swedish Movement Cure, 2116a.
 Sweet Alyssum, 3483b.
 Sweet Bay, 2220b.
 Sweetbriar, 1186b, 3488a.
 Sweet Clover, 2294a.
 Sweet Flag, 3484a.
 Sweet Gum, 2119a.
 Sweet Locust, 1714a.
 Sweet Pea, 3484a.
 Sweet Potato, 3484a.
 Sweet Scabious, 1345b.
 Sweet William, 3484a.
 Sweyn, 1230a.
 Swift, 3484b.
 Swift, Jonathan, 3484b.
 Swimming, 3485b.
 Swinburne, Algernon Charles, 3486b.
 Swine, 1705a.
 Swing, The, 2021a.
 Swiss Guard, 3486b.
 Swinton, William, 3486b.
 Swiss Family Robinson, 3486b.
 Switzerland, 3487a.
 Sword, 3490a.
 Swordfish, 3490a.
 Sycamore, 3490b.
 Sydney, N. S., 3490b.
 Sydney, New South Wales, 3490b.
 Sydney Mines, N. S., 3491a.
 Syenite, 3491a.
 Syllabication, 2683b.
 Syllogism, 3491a.
 Symbol, 3491b.
 Sympathetic System, 2509a.
 Synagogue, 3492a.
 Syncope, 1292b.
 Syndicalism, 3492b.
 Synecdoche, 3492b.
 Synesius, 3093b.
 Synge, John Millington, 3493a.
 Synod, 2932a.
 Synodical Month, 2404b.
 Syntax, 1546a, 3493a.
 Synthesis, 3493a.
 Syracuse, Battle of, 1319b.
 Syracuse, Italy, 3493b.
 Syracuse, N. Y., 3493b.

Syracuse University, 3494a.
 Syria, 3494a.
 Syriac, 3494b.
 Syringa, 3494b.
 Systemic Circulation, 826b.

T

T, 3495a.
 Tabernacle, 3495a.
 Tabernacles, Feast of, 3495b.
 Tables of Mortality, 2417b.
 Taboo, 3496a.
 Tabor, Mount, 3496a.
 Tabriz, Persia, 3496a.
 Tache, Alexander Antonin, 3496b.
 Tacitus, Publius Cornelius, 3497a.
 Tacking, 3158a, 3497a.
 Tacoma, Wash., 3497a.
 Taconic Mountains, 3498a.
 Tactile Corpuscles, 3602a.
 Tadpole, 3498a.
 Taffeta, 3498a.
 Taft, Lorado, 3498a.
 Taft, William Howard, 3498b.
 Tagalogs, 2818a.
 Tagnan, 1365b.
 Tagore, Rabindranath, 1780b, 3503b.
 Tahiti Archipelago, 3336a.
 Tahoe, Lake, 641a, 3504a.
 Tailor Bird, 3504a.
 Taine, Hippolyte Adolphe, 3504a.
 Taiwan Island, 1380b.
 Taj Mahal, 3504b.
 Talc, 3504b.
 Talent, 3505a.
 Tale of a Tub, 3485a.
 Tales of Hoffmann, 2636b.
 Talisman, 3505a.
 Talking Machine, 3505a.
 Tallahassee, Fla., 3506a.
 Talleyrand-Perigord, Charles Maurice, 3506b.
 Tallow, 3507a.
 Tallow Tree, 3507b.
 Talmage, Thomas DeWitt, 3507b.
 Talmud, The, 2507b.
 Talus, 3508a.
 Tamarack, 3508a.
 Tamarind, 3508a.
 Tambourine, 3508b.
 Tamerlane, 1783b.
 Tammany Society, 3508b.
 Tammany Tiger, 2476a.
 Tam O'Shanter, 610a.
 Tampa, Fla., 3509a.
 Tampico, Mex., 3509b.
 Tanager, 3509b.
 Tananarivo, Madagascar, 136a.
 Tancred, 3510a.
 Taney, Roger Brooke, 3510a.
 Tanganyika, 3510a.
 Tangerine, 3510b.
 Tangier, Morocco, 3510b.
 Tango, 1025b.
 Tank, Armored, 3511a.
 Tannhauser, 3512a.
 Tannic Acid, 3512a.
 Tannin, 3512a.
 Tanning, 2072b.
 Tansy, 140a, 3512b.
 Tantalus, 2770a, 3512b.
 Taoism, 3512b.
 Tapajos, 3512b.
 Tapestry, 3513a.
 Tapeworm, 3513b.
 Tapioca, 3514a.
 Tapir, 3514a.
 Taps, 592b.
 Tar, 3514a.
 Tarantula, 3384a, 3514a.
 Tarbell, Ida Minerva, 3514b.
 Tarbush, 1314b.
 Tare, 3514b, 3765b.
 Target, 3514b.

Targums, 1660b, 3515a.
 Tariff, 3515a.
 Tariff of Abominations, 3516a.
 Tarkington, Newton Booth, 3516b.
 Tarpeian Rock, 3517a.
 Tarpon, 3517a.
 Tarquinius, Lucius (the Elder), 3517a.
 Tarquinius, Lucius (the Proud), 3100a, 3517a.
 Tarshish, 3517b.
 Tarsus, Asia Minor, 1368a, 3319a, 3517b.
 Tartan, 3517b.
 Tartar, 3517b.
 Tartar Emetic, 3517b.
 Tartaric Acid, 3518a.
 Tartars, 3518a.
 Tartarus, 3518a, 3585b.
 Tartary, 3518a.
 Tashkent, Asiatic Russia, 3518a.
 Tasmania, 3518b.
 Tasmanian Wolf, 3519a.
 Tasso, Torquato, 3519a.
 Taste, 3519b.
 Tatler, The, 23b.
 Tattooing, 3520a.
 Taunton, Mass., 3520a.
 Taurus, 3520b.
 Tautog, 465a.
 Tax, 3520b.
 Taxicab, 3522a.
 Taxidermy, 3522a.
 Tax Sale, 3521a.
 Tax Title, 3521a.
 Tay, 3523a.
 Taygeta, 2872b.
 Taylor, Bayard, 3523a.
 Taylor, Jeremy, 3523b.
 Taylor, Zachary, 1323a, 3523b.
 Tchad, Lake, 743a.
 Tchaikovsky, Peter, 3525a.
 Tea, 2488a, 3525a.
 Teachers' Institute, 3526a.
 Teaching, Methods of, 2312b.
 Teak, 3526a.
 Teal, 1150a.
 Teasel, 3526b.
 Teck, Alexander Augustus Frederick, 3526b.
 Tebriz, Persia, 3496a.
 Technical and Industrial Education, 3784b.
 Technical High Schools, 3786a.
 Tecumseh (Indian), 3526b.
 Te Deum, 3526b.
 Teetertail, 3185a.
 Teeth, 2973a, 3527a.
 Tegner, Esaias, 3527b.
 Tegucigalpa, Honduras, 3527b.
 Tehachapi Mountains, 640b.
 Teheran, Persia, 3527b.
 Tehuantepec, Isthmus of, 3528a.
 Telautograph, 3528a.
 Telegram, Write a (game), 1239a.
 Telegraph, 1823a, 2417a, 3528b.
 Telegraph, Wireless, 1823a, 3531a.
 Telepathy, 3533a.
 Telephone, 1823a, 3533b.
 Telephone, Wireless, 1823a, 3535a.
 Telescope, 1823a, 3535b.
 Tell, William, 3489a, 3536a.
 Tempe, Vale of, 3536b.
 Temperance, 3536b.
 Temperature, 3536b, 3563b.
 Temperature of the Body, 3536b.
 Tempering, 3537a.
 Templars, Knights, 3537a.
 Temple, 3537a.
 Temple, Tex., 3537b.
 Temple of Fame, 3796b.
 Temujin, 1460a.
 Tenacity, 3537b.
 Tender, 3538a.

Tendon of Achilles, 14a.
 Tendons, 3538a.
 Tenement, 3538a.
 Teniers (family), 3538b.
 Tenlie, 1859b.
 Tennessee, 3538b.
 Tennessee, University of, 3542b.
 Tennessee River, 3542b.
 Tenniel, John, 3543a.
 Tennis, 3543a.
 Tennyson, Alfred, 3022b, 3543a.
 Tenor, 3311b.
 Tent, 657a, 659b.
 Tent Caterpillar, 3544a.
 Tenure of Office Act, 3544b.
 Tepee, 1792a.
 Terceira Island, 307b.
 Terence, 3545a.
 Tereus, 2822a.
 Terhune, Mary Virginia Hawes, 3545a.
 Termites, 3545a.
 Tern, 3545b.
 Terpsichore, 2438b, 3546a.
 Terra Cotta, 3546a.
 Terrapin, 3546a.
 Terre Haute, Ind., 3546b.
 Terrestrial Globe, 1523a.
 Terrier, 1089b, 3546b.
 Territorial Expansion of the United States, 3697b.
 Territories of the United States, 3696a.
 Territory, 3547a.
 Terror, Reign of, 3084b, 3547a.
 Terry, Ellen Alicia, 3547a, 3833a.
 Tertiary Period, 3547b.
 Tertullian, 3547b.
 Tesla, Nikola, 3547b.
 Test Acts, 3547b.
 Testament, 3874b.
 Testator, 3874b.
 Tetanus, 3548a.
 Tetrameter, 2311b.
 Tetrizzini, Luisa, 3548a.
 Tetzl, Johann, 3039b, 3548a.
 Teutonic Group of Languages, 2820b.
 Teutonic Knights, 3548b.
 Teutonic Races, 3548b.
 Texarkana, Ark. and Tex., 3548b.
 Texas, 3549a, 3709b.
 Texas, University of, 3553b.
 Textiles, 3554a, 3686b.
 Thackeray, William Makepeace, 3554a.
 Thaddeus of Warsaw, 2909a.
 Thais, 2277b.
 Thales, 3554b.
 Thalia, 1543b, 2438b, 3555a.
 Thallium, 3555a.
 Thallophytes, 516b, 518a, 3555a.
 Thames, 3555a.
 Thames River, Battle of the, 3555b.
 Thanatopsis, 580a.
 Thane, 3555b.
 Thanet, Octave, 1411a.
 Thanksgiving Day, 3555b.
 That Lass o' Lowrie's, 608b.
 Theater, 3555b.
 Thebes, Egypt, 3557a.
 Thebes, Greece, 3557b.
 Theine, 632a.
 Themes, Outline for, 3557b.
 Themis, 3560b.
 Themistocles, 3560b.
 Theocracy, 3561a.
 Theodoric the Great, 1852b, 3561a.
 Theodosius, 3561b.
 Theology, 3561b.
 Theosophical Society, 3562a.
 Theosophy, 3562a.
 Therapeutics, 3562a.
 Theresa, Saint, 3562b.
 Thermal Springs, 3562b.

Thermal Unit, 3670b.
 Thermoelectricity, 3562b.
 Thermograph, 3563a.
 Thermometer, 181a, 3563a.
 Thermometer, Reading the, 181a.
 Thermo-Multiplier, 3563a.
 Thermopylae, Greece, 3564a.
 Thermopylae of America, 63b.
 Thermos Bottle, 2837a, 3564b.
 Theseum, 3564b.
 Theseus, 271b, 3565a.
 Thessalonians, Epistles to the, 3565a.
 Thessaly, 3565b.
 Thetford Mines, Que., 3565b.
 Thetis, 2457b, 3565b.
 Thian-Shan Mountains, 3577a.
 Thibet, 3577b.
 Thiers, Louis Adolphe, 3565b.
 Thinker, The, 3090a.
 Third-Rail System, 1206a.
 Thirst, 2843b, 3566a.
 Thirty-nine Articles, 3041b.
 Thirty Tyrants, 3566a.
 Thirty Years' War, 3566a.
 Thisbe, 2974b.
 Thistle, 3567a.
 Thistle, Order of the, 3567b.
 Thistle-bird, 110b.
 Thomas, Augustus, 3567b.
 Thomas, George Henry, 3567b.
 Thomas, Theodore, 3568a.
 Thomas a Kempis, 3568a.
 Thompson, David, 3568b.
 Thompson, Denman, 3568b.
 Thompson, James Maurice, 3568b.
 Thomson, James, 3568b.
 Thomson, William, 1935a.
 Thor, 3569a.
 Thoracic Duct, 3569a.
 Thorax, 5a, 772a.
 Thoreau, Henry David, 3569a.
 Thorium, 3569b.
 Thornton, Sir Henry, 3569b.
 Thorn Apple, 3447a.
 Thoroughwort, 499a.
 Thorwaldsen, Bertel, 3569b.
 Thothes III, 3570a.
 Thought, 3570a.
 Thousand and One Nights, 154b.
 Thousand Day Method, 1817a.
 Thousand Island Park, 3163b.
 Thousand Islands, 3570b.
 Thrace, 3571a.
 Thracian Bosphorus, 510b.
 Thrasher, 575b.
 Thrashing Machine, 3571a.
 Thread, 3571b.
 Thread Worm, 3572a.
 Three Bears, The, 1957a.
 Three Butterflies, Story of (theme), 3559a.
 Three Deep (game), 1441a.
 Three Goats, The, 3431b.
 Three Men in a Boat, 1888a.
 Three Rivers, Que., 3572a.
 Three Sisters, 663a.
 Three Tiny Pigs, The, 1958b.
 Thrift, 3572a.
 Thrift (theme), 3559a.
 Thrift Campaign, 3575a.
 Through the Looking-Glass, 95a.
 Thrush, 3576a.
 Thucydides, 3576b.
 Thugs, 3576b.
 Thule, 3576b.
 Thunder, 1467a.
 Thurn, Count, 3566b.
 Thursday, 3577a.
 Thwaites, Reuben Gold, 3577a.
 Thyme, 3577a.
 Thyroid Cartilage, 2061a.
 Tian-Shan Mountains, 3577a.
 Tiara, 3577a.
 Tiber River, 3577a.
 Tiberius, 3577b.
 Tibet, 3577b.

Tibia, 3318b.
 Tic Douloureux, 3578b.
 Ticks, 3578b.
 Ticonderoga, Battles of, 3578b.
 Tidal Air, 549b.
 Tides, 3579a.
 Tien-tsin, China, 3580a.
 Tierceroon, 2977a.
 Tierra del Fuego Islands, 3580b.
 Tiffany, L. C., 3398b.
 Tiffin, Ohio, 3580b.
 Tiflis, Russian Transcaucasia, 3580b.
 Tiger, 3581a.
 Tiger Lily, 3581b.
 Tiglathpileser I, 256b.
 Tigris River, 3581b.
 Tilden, Samuel Jones, 3582a, 3712a.
 Tilefish, 3582a.
 Tiles, 3582a.
 Tillman, Benjamin Ryan, 3582b.
 Tilly, Johann Tserklaes, 3582b.
 Timber Culture Act, 2012b.
 Timber Cutting, 2185b.
 Timbrel, 3508b.
 Timbuktu, French West Africa, 3582b.
 Time, Comparative, 2164a.
 Time, Standard, 3401a.
 Timothy (Apostle), 3583a.
 Timothy (grass), 3583a.
 Timrod, Henry, 3583a.
 Timur, 1783b, 3583b.
 Tin, 3583b.
 Tincture of Opium, 2064a.
 Tinfoil, 3584a.
 Tingley, Katharine A., 3562a.
 Tintoretto, 3584b.
 Tippecanoe, Battle of, 3584b.
 Tirol, 3663b.
 Tissot, James Joseph Jacques, 3585a.
 Tissues, 3585a.
 Tit, 3586b.
 Titanic, 3585a.
 Titanium, 3585b.
 Titans, 3585b.
 Tithes, 3585b.
 Titian, Tiziano, 3585b.
 Titicaca, Lake, 3586a.
 Titlark, 2060b, 2858a.
 Title, 3586a.
 Titles of Honor, 3586b.
 Titles of Nobility, 2577b.
 Titmouse, 3586b.
 Titus (Apostle), 3587a.
 Titus (emperor), 3586b.
 T. N. T., 3635b.
 Toad, 3587a.
 Toad Bug, 3826a.
 Toadstool, 2439a.
 Tobacco, 2571a, 3587a, 3684b.
 Tobacco Root, 463a.
 Tobogganing, 3589a.
 Tobolsk, Siberia, 3589a.
 Tocantins, 3589a.
 Todd, Mary, 2110a.
 Toga, 1143b, 3589b.
 Togo, Heihaichiro, 3589b.
 Togoland, West Africa, 3590a.
 Token Money, 2385a.
 Tokyo, Japan, 3590a, 3612b.
 Toledo, Ohio, 3591a.
 Toll, 3591b.
 Tolstoi, Lyoff Nikolayevitch, 3591b.
 Tomahawk, 3592a.
 Tomato, 3592b.
 Tomb, 3592b.
 Tombigbee River, 3593a.
 Tom Jones, 1319a.
 Tompkins, Daniel D., 3593a.
 Tom Sawyer, Adventures of 848a, 2370b.
 Tomtit, 3586b.
 Tom-tom, 1146a.
 Ton, 3593a.
 Tone, 3593b.
 Tonga Islands, 3593b.

Tonic, 3593b.
 Tongking, French Indo-China, 3594a.
 Tongue, 3594a.
 Tonnage, 3594a.
 Tonsillitis, 3594b.
 Tonsils, 3594b.
 Tonsure, 3594b.
 Tonty, or Tonti, Henry de, 3595a.
 Toombs, Robert, 3595a.
 Toothache Tree, 2937b.
 Top, 3595a.
 Topaz, 461a, 3595b.
 Topeka, Kan., 3595b.
 Tornado, 3596a.
 Toronto, Ont., 3596b.
 Toronto, University of, 3598a.
 Torpedo, 3598a.
 Torpedo (fish), 3599a.
 Torpedo Boat, 3599b.
 Torpedo Boat Destroyer, 3599b.
 Torquemada, Thomas de, 3599b.
 Torrens System, 3599b.
 Torricelli, Evangelista, 3600a.
 Torrington, Conn., 3600a.
 Torsion Balance, 3600b.
 Tort, 3600b.
 Tortoise, 3600b.
 Tortoise Shell, 3601a.
 Torture, 3601a.
 Tory, 3601a.
 Tossing Tally (game), 1441a.
 Totem, 3601b.
 Totten, George M., 2720b.
 Toucan, 3601b.
 Touch, 3602a.
 Touch Ball (game), 1440a.
 Toulon, France, 3602a.
 Toulouse, Battle of, 3847a.
 Toulouse, France, 3602b.
 Tourmaline, 461a, 3602b.
 Tournament, 3603a.
 Tourniquet, 3603a.
 Tours, Battle of, 1319b.
 Tours, France, 3603a.
 Toussaint, Francois Dominique, 3603b.
 Tower, 3603b.
 Tower Bridge, 2158a.
 Tower of London, 3604a.
 Towers of Silence, 3604a.
 Town Meeting, 3604a.
 Township, 2013a, 3604b, 3695a.
 Township in Sections, 2013a.
 Tox-albumins, 314b.
 Toxicology, 3604b.
 Toxins, 3605a.
 Toynbee, Arnold, 3336a.
 Tracery, 3605a.
 Trachea, 3605a.
 Tracheotomy, 995a.
 Trachyte, 3605a.
 Tractarianism, 2694a.
 Traction Engine, 3605b.
 Trade Acceptance, 3605b.
 Trade Discount, 1079b.
 Trade Game, 1441b.
 Trade-mark, 3606a.
 Trade Schools, 3786a.
 Trade Unions, 1999b.
 Trade Winds, 3606a.
 Trafalgar, 3606b.
 Tragacanth, 3606b.
 Tragedy, 1115a, 3606b.
 Tragopan, 3607a.
 Trailing Arbutus, 157b.
 Traill, Catherine Parr, 3607a.
 Trajan (Marcus Ulpius Traianus), 3607a.
 Trajan's Column, 3096b, 3607b.
 Trance, 3607b.
 Transalpine Gaul, 1455a.
 Trans-Atlantic Flights, 1362b.
 Transcendentalism, 3607b.
 Transcontinental Systems, 2999b.
 Transept, 3607b.
 Transfiguration, The, 2705a.

Transformer, 3608a.
 Transfusion of Blood, 3608a.
 Transit Instrument, 3608a.
 Transit of Venus, 3753b.
 Transmigration of the Soul, 3608b.
 Transpiration, 2074b.
 Transportation, 3608b; in the United States, 3687b.
 Trans-Siberian Railroad, 3294a, 3608b.
 Transvaal, The, 3609b.
 Transylvania, 3611a.
 Trapdoor Spider, 3611a.
 Trapezium, 2977a, 3611b.
 Trapezoid, 2977a, 3611b.
 Trapping, 3611b.
 Trappists, 3612a.
 Travels in Distant Lands, 3612a.
 Traverse City, Mich., 3622b.
 Travertine, 3622b.
 Trawling, 3622b.
 Treadmill, 3622b.
 Treason, 3623a.
 Treasure Island, 3423b.
 Treasure State, The, 2396b.
 Treasury Department, 3623a.
 Treaty, 3623b.
 Trebizond, Turkey, 3623b.
 Treble, 3624a.
 Tree, 3624a.
 Tree, Herbert Beerbohm, 3631a.
 Tree, The (poem), 2020b.
 Tree Frog, 3631a.
 Tree-Planters' State, 2498a.
 Tree Toad, 3631a.
 Trefoil, 3631b.
 Trent, Council of, 3093b, 3631b.
 Trent Affair, 3323b, 3631b.
 Trent Canal, 678a, 679a.
 Trente et Quarante, 3123a.
 Trenton, Battle of, 3632b.
 Trenton, N. J., 3632a.
 Trenton, Ont., 3632b.
 Trenton Series, 3632b.
 Trent River, 3631b.
 Trepan, 3632b.
 Trephining, 3633a.
 Trespass, 3633a.
 Trevithick, Richard, 2149b.
 Trial by Battle, 363a.
 Triangle, 207b, 3633a.
 Triassic System, 3633a.
 Tribasic Acid, 14a.
 Tribune, 3633b.
 Trichina, 3633b.
 Trichiniasis, 3634a.
 Tricolor, 3634b.
 Tricycle, 3634b.
 Trieste, Italy, 3634b.
 Trigonometry, 3634b.
 Trillum, 3635a.
 Trimeter, 2311b.
 Trinidad, Colo., 3635b.
 Trinidad Island, 3622a, 3635a.
 Trinitrotoluol, 3635b.
 Trinity, 3635b.
 Trinity Sunday, 3636a.
 Triphthong, 2683a.
 Triple Alliance, 3636a.
 Triple Entente, 3636a.
 Triple Expansion Engine, 3414b.
 Tripoli (city), 3636b.
 Tripoli (geology), 844b.
 Tripoli, North Africa, 3636b.
 Trireme, 3637a.
 Triumph, 3637a.
 Triumphal Arch, 158a.
 Triumvirate, 631a, 3102b, 3637a.
 Tristram Shandy, 3422a.
 Trocadero, Palace of the, 2737b.
 Trochaic Meter, 2311b.
 Trogon, 3637a.
 Trojan War, 2457b, 3639a.
 Trolling, 3637b.

Trollope, Anthony, 3637b.
 Trolls, 1293b.
 Trombone, 3637b.
 Tromp, Martin Harpertzoon, 3637b.
 Tropic Bird, 3637b.
 Tropics, 1167a, 3638a.
 Trotzky, Leon, 493b, 3130a, 3145b, 3638a.
 Troubadours, 3638b.
 Trout, 3638b.
 Trovatore, II, 1771a.
 Trouvere, 3638b.
 Trowbridge, John Townsend, 3639a.
 Troy, 2457b, 3639a.
 Troy, N. Y., 3639a.
 Troy Pound, 2927a, 3843a.
 Troy Weight, 3639b.
 Truce, 3802b.
 Truce, Flag of, 1338b.
 Truffle, 3640a.
 Trumbull, Jonathan, 3640a.
 Trumbull, Lyman, 3640a.
 Trumpet, 3640a.
 Trumpet Fish, 388a.
 Trumpet Flower, 3640b.
 Trumpet-wood, 732b.
 Truro, N. S., 3640b.
 Truss Bridges, 555a.
 Trust, 3641a.
 Trust Company, 3640b.
 Trustee, 3641a.
 Trypsin, 1075b, 2725b, 2784b.
 Tsana, Lake, 9b.
 Tsar, 1015a.
 Tschalkowsky, Peter Ilytch, 3525a.
 Tsetse Fly, 3642a.
 Tuberculosis, or Consumption, 3642a.
 Tuberoses, 3642b.
 Tubular Bridges, 555b.
 Tucson, Ariz., 3642b.
 Tucuman, Argentina, 3643a.
 Tudor, House of, 3643a.
 Tudor Style, 3643a.
 Tuesday, 3643b.
 Tufa, 3643b.
 Tufts College, 3643b.
 Tuileries, 3643b.
 Tulane, Paul, 3644a.
 Tulane University, 3644a.
 Tulip, 3644a.
 Tulip Tree, 3644b.
 Tulsa, Okla., 3644b.
 Tumbleweed, 3645a.
 Tumor, 3645a.
 Tuna, 3645a.
 Tundra, 3645a.
 Tungsten, 3645b.
 Tungsten Lamp, 1203b.
 Tunic, 1143b, 3645b.
 Tuning Fork, 3645b.
 Tunis (protectorate), 3645b.
 Tunkers, 1154b.
 Tunnel, 3646a.
 Tunny, 3645a, 3646a.
 Tupelo, 465a.
 Tupper, Charles, 3646a.
 Turanian, 3646b.
 Turban, 3646b.
 Turbine, 3647a.
 Turbot, 3647b.
 Turgenieff, Ivan Sergeyevitch, 3648a.
 Turin, Italy, 3648a.
 Turkestan, 3648b.
 Turkey, 3649a, 3763b, 3919a.
 Turkey (bird), 3653b.
 Turkey Buzzard, 3654a.
 Turkey Red, 2210a.
 Turkish Bath, 361a.
 Turks, 3654a.
 Turmeric, 3654a.
 Turner, Joseph Mallard William, 3654a.
 Turner, Nat, 3655b.
 Turnip, 3654b.
 Turnstone, 3654b.
 Turnverein, 3654b.

Turpentine, 140a, 3655a.
 Turquoise, 461a, 3655b.
 Turtle, 3655b.
 Turtle Dove, 2851b, 3655b.
 Tuscaloosa, Ala., 3656a.
 Tuscan Order, 895b.
 Tuscany, 3656a.
 Tuscarora Indians, 3656a.
 Tuskegee Normal and Industrial Institute, 3656a.
 Tussock Moth, 3656b.
 Twain, Mark, 847b.
 Tweed, 3656b.
 Tweed, William Marcy, 3656b.
 Tweed River, 3656b.
 Twelfth Day, 1871b.
 Twelve Great Paintings, 2706b.
 Twelve Labors of Hercules, 1676a.
 Twelve Tables, Law of the, 3100a, 3657a.
 Twenty Thousand Leagues under the Sea, 3761a.
 Twilight, 3657a.
 Twilight Sleep, 3657b.
 Two Cities, A Tale of, 1072b.
 Two Green and Glittering Gold-Chafers, 1960a.
 Two-step, 1025b.
 Two Years Before the Mast, 1024b.
 Tycho Brahe, 539b.
 Tyler, John, 3657b.
 Tyler, Tex., 3660a.
 Tyler, Wat, 3660b.
 Tympanum, 1163a.
 Tyndale, William, 3660b.
 Tyndall, John, 3660b.
 Type, 1597b, 1823a, 3661a.
 Typesetting Machines, 2117a, 2390a.
 Typewriter, 1823a, 3662a.
 Typhoid Fever, 3662b.
 Typhoon, 797b, 3663a.
 Typhus Fever, 3663a.
 Tyre, Phoenicia, 3663b.
 Tyrol, 3663b.

U

U, 2682b, 3664a.
 Udal, Nicholas, 3664a.
 Uffizi, 3664a.
 Uganda, British East Africa, 3664a.
 Ugly Duckling, The, 3435b.
 Uhlands, 3665a.
 Uinta Mountains, 3665a.
 Uitlanders, 3349b, 3611a.
 Ukraine, The, 3665a.
 Ulcer, 3665b.
 Ulna, 3318a.
 Ultima Thule, 3576b.
 Ultramarine, 3665b.
 Ulysses, 2896a, 3665b.
 Umbelliferae, 3666a.
 UMBER, 3666a.
 Umbrella Bird, 3666a.
 Umiak, 1254b.
 Unalaska Island, 3666a.
 Uncas, 3666a.
 Uncial Letters, 3950a.
 Uncle Sam, 571b.
 Uncle Tom's Cabin, 3446a.
 Unction, or Extreme Unction, 3666b.
 Underground Railroad, 3666b.
 Underground Railway, 3458a.
 Undershot Wheel, 3831b.
 Underwood, Oscar, 3666b.
 Underwood-Simmons Tariff Act, 3516b.
 Undines, 1294a.
 Unemployment, 3667a.
 Ungava, Canada, 3668a.
 Ungulates, 3668a.
 Unicorn, 3668a.
 Unicorn Fish, 2475a.
 Unicorn Whale, 2475a.

Uniforms, Military, 3668a.
 Uniforms, Naval, 3668a.
 Union, Act of, 3669a.
 Union, States of the, 3696a.
 Union Jack, 1342a.
 Union of South Africa, 3669a.
 Uniontown, Pa., 3670a.
 Unit, 3670a.
 Unitarians, 3670b.
 United Colonies of New England, 2527b.
 United Daughters of the Confederacy, 909b.
 United Kingdom, The, 3671a.
 United Press, 254b.
 United Provinces of Agra and Oudh, 3671a.
 United States, Chamber of Commerce of the, 746b.
 United States, Education in the, 3699a.
 United States, Great Seal of the, 3692a.
 United States, History of the, 3699b.
 United States, Possessions of the, 3694a.
 United States, Supreme Court of, 3475b.
 United States, Territorial Expansion of the, 3697b.
 United States, Territories of the, 3696a.
 United States Army, 224b.
 United States Coast Guard, 866b.
 United States Colonies, 884b.
 United States Courts, 975a.
 United States Indian Industrial School, 3671b.
 United States in the World War, 3927a.
 United States National Bureau of Standards, 3400a.
 United States Naval Academy, 2492b.
 United States Notes, 2386a.
 United States of America, 3671b.
 United States Sculpture, 3235b.
 United States Senate, 3252a.
 United States Steel Corporation, 3719a.
 United States Weather Bureau, 3836a.
 United Workmen, Ancient Order of, 119a.
 Univalves, 2380b.
 Universal City, Calif., 642b.
 Universalists, 3719b.
 Universal Language, 3719b.
 Universe, 3719b.
 University, 879b, 3720a.
 University Extension, 3721a.
 University of Halle, 1616a.
 University of the State of New York, 2552a.
 Unspeakable Turk, 3651a.
 Unter den Linden, 397a, 3721b.
 Upas, 3721b.
 Upland Cotton, 969a.
 Upper Canada, 2658a.
 Ural Mountains, 3721b.
 Ural River, 3722a.
 Urania, 2438b, 3722a.
 Uranium, 3722a.
 Uranus (mythology), 3722a.
 Uranus (planet), 3722a.
 Urban (Popes), 3722b.
 Urbana, Ill., 3722b.
 Urine, 3722b.
 Ursa Major, 368b, 3723a.
 Ursa Minor, 3723a.
 Urso, Camilla, 3723a.
 Ursulines, 3723a.
 Uruguay, 3723b.
 Uruguay River, 3724b.
 Usury, 3724b.
 Utah, 3725a.
 Utah, University of, 3728b.

Utah Lake, 3728b.
 Ute, 3728b.
 Utica, N. Y., 3728b.
 Utica, Phoenicia, 3728b.
 Utilitarianism, 3729a.
 Utopia, 2411b, 3729b.
 Utrecht, Netherlands, 3729b.
 Utrecht, Peace of, 3729b.
 Uz, 3730b.

V

V, 3731a.
 Vaca, Cobeza de, 3553a.
 Vacation Schools, 3731a.
 Vaccination, 1886b, 3731a.
 Vaccine Therapy, 3731b.
 Vacuum, 3732a.
 Vacuum Cleaner, 3732a.
 Vail, Alfred, 2417a, 3530b.
 Valdai Hills, 3732a.
 Valencia, Spain, 3732a.
 Valens, 3732b.
 Valentine, Saint, 3732b.
 Valentinian I, 3732b.
 Valentinian III, 3733a.
 Vale of Tempe, 3536b.
 Valerian, 3733a.
 Valhalla, 3733a.
 Valkyries, 3733a.
 Valladolid, Mex., 2411b.
 Vallejo, Calif., 3733a.
 Valley, 3733b.
 Valleyfield, Que., 3734a.
 Valley Forge, 3734a.
 Valmy, Battle of, 1319b.
 Valois, House of, 3734b.
 Valparaiso, Chile, 3734b.
 Valparaiso University, 3735a.
 Value, 3475a.
 Valve, 3735a.
 Vampire, 3735a.
 Vampire Bat, 3735b.
 Vanadium, 3735b.
 Van Buren, Martin, 3735b.
 Vancouver, B. C., 3739b.
 Vancouver, George, 3740a.
 Vancouver, Wash., 3740b.
 Vancouver Island, 3740b.
 Vandals, 3741a.
 Vanderbilt (family), 3741a.
 Vanderbilt University, 3741b.
 VanDyck, Anthony, 3741b.
 Van Dyke, Henry, 3742a.
 Van Hise, Charles Richard, 3742b.
 Van Horn, William Cornelius, 3742b.
 Vanilla, 3742b.
 Vanity Fair, 372a, 3554b.
 Vannucci, Pietro, 2800b.
 Van Rensselaer, Stephen, 3743a.
 Van Twiller, Wouter, 2560a.
 Vapor, 3743a.
 Vapor Light, 1203b.
 Varicose Veins, 3743a.
 Variety, 3743a.
 Variola, 3325a.
 Varioloid, 3743b.
 Varnish, 3743b.
 Vasco da Gama, 1436b.
 Vase, 3744a.
 Vaseline, 3744a.
 Vashti, 424a.
 Vassal, 1314a.
 Vassar, Matthew, 3744b.
 Vassar College, 3744a.
 Vaterland, The, 2091b, 3283b.
 Vatican, 3744b.
 Vaudeville, 3745a.
 Vatican Council, 2902b, 3745a.
 Vatican Library, 3745a.
 Vault, 3745a.
 Vecchio, Palma, 2705a.
 Vecellio, Tiziano, 3585b.
 Veda, 3745a.
 Vedic Literature, 540a.
 Veery, 3576b.

Vega Carpio, Felix Lope de, 3745b.
 Vegetable Butter, 98a.
 Vegetable Fixed Oils, 2645a.
 Vegetable Ivory, 1858a.
 Vegetable Leather, 2073a.
 Vegetable Parchment, 2729a.
 Vegetables, 3745b.
 Vegetarianism, 3746a.
 Veil, 3746a.
 Vein (geology), 3746b.
 Vein (physiology), 2842b, 3746b.
 Veining (botany), 2075a, 3747b.
 Velasquez, Don Diego Rodriquez, 3747a.
 Veldt, 3669b.
 Velocipede, 3747a.
 Velocity, 3747b.
 Velvet, 3747b.
 Velveteen, 3747b.
 Velvet Leaf, 9a, 1791a.
 Vena Cavae, 1656a.
 Venation, 2075a, 3747b.
 Vendetta, 3748a.
 Vendome Column, 3748a.
 Veneer, 3748a.
 Venerable Bede, 372b.
 Venezuela, 3748b.
 Venice, 3751a.
 Venison, 1048a.
 Venizelos, Eleutherios, 3752a.
 Ventilation, 1104a, 1658b.
 Ventricle, 1656a.
 Ventriloquism, 3752b.
 Venue, Change of, 3753a.
 Venus (astronomy), 3753a.
 Venus (mythology), 3753a.
 Venus and Adonis, 3268a.
 Venus de Milo, 3231b.
 Venus's Flower Basket, 3389b, 3573b.
 Venus's Flytrap, 521b, 3753b.
 Vera Cruz, Mex., 3754a.
 Verb, 2049b, 2055a, 3754a.
 Verbena, 3754b.
 Verdi, Giuseppe, 53a, 3754b.
 Verdigris, 3755a.
 Verdun, Battle of, 3755b, 3921a.
 Verdun, France, 3755a.
 Verendrye, Sieur de la, 3954b.
 Vereshtchagin, Vasili, 3755b.
 Vergil, 3755b.
 Vermes, 3756b.
 Vermicelli, 2197a.
 Vermiform Appendix, 146b, 3756b.
 Vermilion, 3756b.
 Vermont, 3757a.
 Vermont, University of, 3761a.
 Vernal Equinox, 1035a, 3242b.
 Verne, Jules, 3761a.
 Verona, Italy, 3761a.
 Veronese, Paul, 2705a, 3761b.
 Veronica, Saint, 3761b.
 Verrazano, Giovonni da, 3761b.
 Versailles, France, 3761b.
 Versailles, Palace of, 3762a.
 Versailles, Treaty of, 2956a, 3762b.
 Verse, 3764a.
 Verst, 2336a.
 Vertebrata, 3764b.
 Vertigo, 3764b.
 Vespasian, 3764b.
 Vespusius, Americus, 112a, 3356a.
 Vest, George Graham, 1089b.
 Vesta, 3765a.
 Vesuvius, Mount, 3765a.
 Vetch, 3765b.
 Veterans, Sons of, 3346a.
 Veterinary Medicine, 3765b.
 Veto, 3766a.
 Veto Bill, 1564b.
 Via Dolorosa, 1889a.
 Viaduct, 3766a.
 Via Sacra, 3096b.
 Vicar, 3766b.
 Vicar of Wakefield, The, 1533b.

Vice-Admiral, 26b.
 Vice-President, 3766b.
 Viceroy, 3766b.
 Vicksburg, Miss., 3767a.
 Victor Emmanuel II, 3767a.
 Victor Emmanuel III, 3767b.
 Victoria (Queen), 3767b.
 Victoria, Australia, 3768b.
 Victoria, B. C., 3769b.
 Victoria Cross, 3770a.
 Victoria Falls, 3770a.
 Victoria Nyanza, 3770a.
 Victory, The, 2505a.
 Vicuna, 3770b.
 Vienna, Austria, 3770b.
 Vienna, Congress of, 3771b.
 Vikings, 2603a.
 Villa, Francisco, 2322b, 3772a.
 Village Blacksmith, The, 3016a.
 Villeins, 3772b.
 Villi, 3772b.
 Vimy Ridge, 3925a.
 Vilna, Russia, 3772b.
 Vincennes, Ind., 3772b.
 Vincent, George Edgar, 3773a.
 Vincent, John Heyl, 3773b.
 Vinci, Leonardo da, 2704a, 3772b.
 Vinegar, 13a, 3774a.
 Vinland, 3774b.
 Vinsenne, Francois Morgan de, 3773a.
 Viol, 3774b.
 Violet, 3774b.
 Violin, 3774b.
 Violoncello, 3774b, 3775a.
 Viper, 3775b.
 Virchow, Rudolf, 3775b.
 Vireo, 3775b.
 Virgil, 3755b.
 Virginia, 3776b.
 Virginia, Minn., 3781b.
 Virginia, University of, 3782a.
 Virginia City, Nev., 3782a.
 Virginia Cowslip, 2188b.
 Virginia Creeper, 1858b, 2882a, 3782a.
 Virginians, The, 3554b.
 Virginia Resolutions, 1941b.
 Virgin Islands of the United States, 3620b, 3776a.
 Virginus, 3712a.
 Virgo, 3782b.
 Virus, 3782b.
 Visayans, 2818a.
 Viscount, 3782b.
 Vishnu, 3782b.
 Visible Speech, 3782b.
 Visigoths, 1540a.
 Vision, 3783a.
 Vision of Piers Plowman, 2016a, 2121a.
 Vision of Sir Launfal, 1545b.
 Vistula, 3783b.
 Vital Capacity, 549b.
 Vital Statistics, 2905b.
 Vitamines, 3783b.
 Vitch, 2467b.
 Vitreous Humor, 1287b.
 Vitriol, Oil of, 3468a.
 Vivisection, 3783b.
 Vizier, 3784a.
 Vladimir the Great, 3142a.
 Vladivostok, Siberia, 3784a.
 Vocational Education, 3784b.
 Vocational Guidance, 3785a.
 Vocational Schools, 3785b.
 Vodka, 3787a.
 Voice, 3787a.
 Volapuk, 3787b.
 Volatile Alkali, 113b.
 Volatile Oils, 2645a.
 Volcano, 1479b, 3787b.
 Vole, 3789a.
 Volga River, 3789a.
 Voliva, Wilbur G., 1110a.
 Volt, 3789b.
 Volta, Alessandro, 3789b.
 Voltaic Battery, 1196a.
 Voltaic Electricity, 1202a.
 Voltaire, 3789b.

Voltmeter, 3790a.
 Volume, Measure of, 2315b.
 Volunteers, 3790b.
 Volunteers of America, 3790b.
 Vom, 2578a.
 Vomer, 1290b.
 Vomiting, 3791a.
 Von, 2578a.
 Vorticella, 3791a.
 Vosges Mountains, 3791a.
 Vote, 325b, 1194a.
 Voters, Registration of, 3043b.
 Voting Machine, 3791b.
 Vow, The Sun, 3236b.
 Vowels, 2681b, 3791b.
 Vulcan, 3792a.
 Vulcanizing, 1536b, 1823a, 2877a, 3127b.
 Vulgate, 3792a.
 Vulture, 3792b.

W

W, 3793a.
 Wabash, Ind., 3793a.
 Wabash River, 3793a.
 Wacht Am Rhein, Die, 3793a.
 Waco, Tex., 3552b, 3793b.
 Wadai, French Congo, 3793b.
 Wager, 3793b.
 Wages, 3794a.
 Wagner, Wilhelm Richard, 3794b.
 Wagon, 3795a.
 Wagram, Battle of, 2472a, 3795a.
 Wagtail, 3795b.
 Wahunsonacook, 2928b.
 Waikiki Beach, 3618a.
 Waite, Morrison Remick, 3795b.
 Wake, 3795b.
 Wake Robin, 3635a.
 Waldenses, 3795b.
 Waldstein, Albrecht Eusebius Wenzel von, 3798b.
 Wales, 3796a.
 Wales, Prince of, 3796b.
 Walhalla, 3796b.
 Walker, Francis Amasa, 3796b.
 Walker, John G. 2721a.
 Walker, William, 583b, 3797a.
 Walkerville, Ont., 3797a.
 Walking Leaves, 2071a.
 Walking Stick, 3797b.
 Wallabies, 1925b.
 Wallace, Alfred Russell, 3797b.
 Wallace, John F. 2722b.
 Wallace, Lewis, 3798a.
 Wallace, William, 3224a, 3798a.
 Walla Walla, Wash., 3798b.
 Wallenstein, Albrecht Eusebius Wenzel von 3567a, 3798b.
 Wallflower, 3799a.
 Wall of China, The Great, 1566b.
 Walloons, 382b, 3799b.
 Wall Paper, 3799b.
 Wall Street, 3799b.
 Walnut, 3799b.
 Walpole, Horace, 3800a.
 Walpole, Robert, 3800a.
 Walrus, 3800b.
 Walrus and the Carpenter, The, 2028a.
 Waltham, Mass., 3800b.
 Walton, Izaak, 3801a.
 Waltz, 1025a, 3801a.
 Wampanoag Indians, 3801a.
 Wampum, 3801a.
 Wanamaker, John, 3801b.
 Wandering Jew, 3801b.
 Wandering Jew (botany), 3801b.
 Wapiti, 1215a.
 War, 3802a.
 War, Declaration of, 3802b.
 War, Declarations of, in 1914, 3916b.
 War Declarations of, in 1915, 3920a.

- War, Declarations of, in 1916 3920b.
 War, Declarations of, in 1917, 3924b.
 War, Department of, 3803a.
 War and Peace, 3592a.
 Warbeck, Perkin, 3224a.
 Warblers, 3803a.
 Ward (city), 829a, 2433b.
 Ward (law), 3803b.
 Ward, Artemus, 573a.
 Ward, Elizabeth Stuart Phelps, 3803b.
 Ward, Henry A., 3523a.
 Ward, Mrs. Humphry, 3803b.
 Ward, John Quincy Adams, 3804a.
 Warden, 2943b.
 Warfield, David, 3804a.
 War Lord of Europe, 3877b.
 Warner, Charles Dudley, 3804b.
 Warner, Seth, 3804b.
 War of 1812, 3804b.
 War of the Austrian Succession, 299a, 3459a.
 War of the Bavarian Succession, 3460a.
 War of the Polish Succession, 3459a.
 War of the Spanish Succession, 3458b.
 Warrant, 3806a.
 Warranty Deed, 1047a.
 Warren, Joseph, 601a, 3806b.
 Warren, Ohio, 3806b.
 Warren, Pa., 3806b.
 Warsaw, Poland, 3806b.
 Warship, 2495b.
 Wart, 3807a.
 Wart Hog, 3807a.
 Warwick, R. I., 3807b.
 Warwick, Richard Neville, 3807b.
 Wasatch Mountains, 3807b.
 Washburn College, 3807b.
 Washing Soda, 140a.
 Washington (state), 3808a.
 Washington, Booker Taliaferro, 3656a, 3816b.
 Washington, D. C., 3812b.
 Washington, George, 439a, 440a, 3817a.
 Washington, Lawrence, 3817b.
 Washington, Martha, 3822a.
 Washington, Pa., 3822a.
 Washington, Treaty of, 3822a.
 Washington, University of, 3822b.
 Washington and Lee University, 3822b.
 Washington Arch, 3822b.
 Washington Elm, 3823a.
 Washington Monument, 3823a.
 Washington University, 3823a.
 Washita River, 3823a.
 Wasp, 3823b.
 Watauga Association, 3823b.
 Watch, 3823b.
 Watchful Waiting, 3715a.
 Watch on the Rhine, The, 3060b, 3793a.
 Water, 1097a, 3338b, 3825a.
 Water, Ordeal by, 2670b.
 Water Beetle, 3825b.
 Water Boatmen, 3826a.
 Water Bug, 3826a.
 Waterbury, Conn., 3826b.
 Water Chinquapin, 2505b, 3827a.
 Water Colors, 2702a, 3826b.
 Waterfall, 723a.
 Water Gaps, 3734a.
 Water Gas, 1452a.
 Water Lily, 3826b.
 Waterloo, Battle of, 1320a, 3827a.
 Waterloo, Iowa, 3828a.
 Waterloo, Ont., 3828a.
 Water-mark, 2728a.
 Watermelon, 3828a.
 Water-motor, 3831b.
 Water Ouzel, 1078b.
 Water Plants, 152b.
 Water Polo, 3828b.
 Water Power, 3828b.
 Waterproofing, 3829b.
 Water Purification, 3829b.
 Water Scorpion, 3826a.
 Watershed, 354a, 1084b, 3830a.
 Waterspout, 3830b.
 Water Striders, 3826a.
 Water Supply, 1101b.
 Water Tiger, 3826a.
 Waterton Lakes Park, 2743b.
 Watertown, N. Y., 3830b.
 Watertown, S. D., 3830b.
 Waterville, Maine, 3831a.
 Watervliet, N. Y., 3831a.
 Water Wheel, 3831a.
 Waterworks, 3831b.
 Watson, John, 3832a.
 Watson, Thomas E., 3832a.
 Watson, William, 3832a.
 Watt, 3832b.
 Watt, James, 3412b, 3832b.
 Watteau, Jean Antoine, 3832b.
 Watterson, Henry, 3833a.
 Wattle Tree, 11a.
 Watts, George Frederick, 3833a.
 Watts, Isaac, 1750a, 3833b.
 Wat Tyler's Rebellion, 3660b.
 Waukegan, Ill., 3833b.
 Waukesha, Wis., 3834a.
 Wausau, Wis., 3834a.
 Waverly Novels, 3226b.
 Waves, 3834a.
 Wax, 3834b.
 Wax Myrtle, 681b.
 Wax Tree, 681b.
 Waxwing, 3834b.
 Way Bill, 432a.
 Waycross, Ga., 3835a.
 Wayne, Anthony, 3835a.
 Wealth, 3835b.
 Wealth of Nations, The, 3326b.
 Weasel, 3835b.
 Weather, 1462b.
 Weather Bureau, 3429a, 3836a.
 Weather Chart, 3837b.
 Weather Map, 2311a, 3837b.
 Weaver, James Baird, 3838a.
 Weaver Bird, 3838b.
 Weaving, 3838b.
 Webb City, Mo., 3839b.
 Weber, Karl Maria Friedrich Ernst von, 3839b.
 Webster, Daniel, 3840a.
 Webster, Henry Kitchell, 3841a.
 Webster, Noah, 3841a.
 Webster-Ashburton Treaty, 3841a.
 Wedge, 3841a.
 Wedgwood, Josiah, 3841b.
 Wedgwood, Thomas, 2827b.
 Wedgwood Ware, 3841a.
 Wednesday, 3841b.
 Weed, Thurlow, 3841b.
 Weeds, 3841b.
 Week, 3842a.
 Weeping Willow, 3880a.
 Weevil, 3842a.
 Wee Willie Winkie and Other Stories, 1984a.
 Weighing Scale, 3842b.
 Weight, 3843a.
 Weight, Atomic, 278a.
 Weight, Unit of, 2315b.
 Weights and Measures, 3843a.
 Weimar, Germany, 3844a.
 Welding, 3844b.
 Welland, Ont., 3844b.
 Welland Canal, 3844b.
 Well Boring, 3845a.
 Welles, Gideon, 3845b.
 Wellesley, Richard Colley Wellesley, 3845b.
 Wellesley College, 3846a.
 Wellington, Arthur Wellesley, 3846a.
 Wellington, New Zealand, 3847a.
 Wells, Herbert George, 3847a.
 Welsbach, Karl, 3847b.
 Welsbach Burner, 3847b.
 Welwitschia, 3847b.
 Wentworth, Thomas, 3446b.
 Wesley (family), 3847b.
 Wesleyan Methodists, 3848b.
 West, Benjamin, 3848b.
 Westbrook, Harriet, 3276b.
 West Chester, Pa., 3849a.
 Western Australia, 3849a.
 Western Reserve, 3849b.
 Western Reserve University, 3849b.
 Westfield, Mass., 3849b.
 West Flanders, 1344a.
 West Indies, 3850a.
 Westinghouse, George, 54a, 3850b.
 Westminster Abbey, 3850b.
 Westminster Hall, 3851a.
 West Orange, N. J., 2668a.
 Westphalia, 3851a.
 Westphalia, Peace of, 3851a.
 West Point, N. Y., 3851b.
 West Virginia, 3852a.
 West Virginia University, 3855a.
 Wet Docks, 1088a.
 Weyler, Nicolau Valerlando, 3855a.
 Weyman, Stanley John, 3855b.
 Whale, 3855b.
 Whalebone, 3856b.
 Wharton, Edith, 3856b.
 What Does Little Birdie Say, 2021a.
 Wheat, 3857a.
 Wheat Insects, 3859a.
 Wheatstone, Charles, 3859a.
 Wheat Thief, 1586a.
 Wheel, 3859b.
 Wheel and Axle, 3859b.
 Wheeler, Benjamin Ide, 3860a.
 Wheeler, Joseph, 3860a.
 Wheeler, William Almon, 3860b.
 Wheeling, W. Va., 3860b.
 When I Survey the Wondrous Cross, 1750b.
 When We Plant a Tree (poem), 3630b.
 Where Go the Boats, 2026a.
 Whetstones, 1714a.
 Whigs, 2690b, 3601a, 3708b, 3861a.
 While Shepherds Watched, 2026b.
 Whip Grafting, 1544b.
 Whippoorwill, 3861a.
 Whirligig Beetles, 3826a.
 Whirlpool, 3861a.
 Whirlwind, 3861b.
 Whisky, 3861b.
 Whisky Insurrection, 3861b.
 Whisky Ring, 3712a, 3862a.
 Whispering Gallery, 3349a.
 Whist, 3862a.
 Whistler, James Abbott McNeill, 3863b.
 White (color), 3863b.
 White, Andrew Dickson, 3864a.
 White, Edward Douglass, 3864a.
 White, Richard Grant, 3864b.
 White, Stewart Edward, 3864b.
 White, William Allen, 3864b.
 White Ants, 3545a.
 White Arsenic, 232b.
 White Bronze, 570a.
 White Caps, 3864b.
 Whitefield, George, 3865a.
 Whitefish, 2298a, 3865a.
 White House, 3865a.
 White Laurel, 2220b.

White Lead

4052

Yam

White Lead, 3865b.
 White Mountains, 3865b.
 White Paper, 477b.
 White Pine, 2855a.
 White Plains, Battle of, 3866b.
 White Precipitate, 140a.
 White River (Ark.), 3866b.
 White River (Ind.), 3866b.
 White Sea, 3867a.
 White Vitriol, 3977a.
 Whitewood, 359a.
 Whitlock, Brand, 3867a.
 Whitman, Marcus, 3867a.
 Whitman, Walt, 3867b.
 Whitney, Eli, 1823a, 3867b.
 Whitney, James Pliny, 3868a.
 Whitney, Mount, 641a, 3868a.
 Whittier, John G., 3023a, 3868b.
 Whooping Cough, 785a, 3869a.
 Whortleberry, 1729a.
 Wichita, Kans., 3869a.
 Wichita Falls, Tex., 3869b.
 Wiclif, John, 3951a.
 Widgeon, 3869b.
 Wiesbaden, Prussia, 3870a.
 Wigwam, 3870a.
 Wiggin, Kate Douglas, 3075a.
 Wight, Isle of, 1848a.
 Wilberforce, Samuel, 3870a.
 Wilberforce, William, 3870b.
 Wilcox, Ella Wheeler, 3870b.
 Wild Cat, 3870b.
 Wildcat Banks, 3871a.
 Wilde, Oscar, 3871a.
 Wilderness, Battle of the, 3871a.
 Wild Flower, 123a.
 Wild Laurel, 3066b.
 Wilhelmina, Queen, 3871b.
 Wilhelm Meister, 1529b.
 Wilkes, Charles, 3631b, 3872a.
 Wilkesbarre, Pa., 3872a.
 Wilkie, David 3872b.
 Wilkins, Mary Eleanor, 1408b.
 Will (law), 3874b.
 Will (psychology), 790a, 2959a, 2962b, 3873a.
 Willamette River, 3874b.
 Willard, Emma Hart, 3875a.
 Willard, Frances Elizabeth, 3875a.
 William I (the Conqueror), 1230b, 1630a, 3875b.
 William II Rufus, 3875b.
 William III (England), 3876a.
 William IV (England), 3876b.
 William I (Germany), 3876b.
 William II (Germany), 3877a.
 William and Mary College, 3878a.
 William of Orange, 2515b, 3397a, 3878a.
 William of Wied, Prince, 69a.
 William the Lion, 3223b.
 Williams, George, 3970b.
 Williams, John Sharp, 3878b.
 Williams, Roger, 2276a, 2953b, 3064a, 3701b, 3172a, 3878b.
 Williamsburg, Va., 3878b.
 Williamsburg Bridge, 556a.
 Williams College, 3879a.
 Williamsport, Pa., 3879a.
 Willimantic, Conn., 3879b.
 Willis, John, 3287b.
 Willis, Nathaniel Parker, 3879b.
 Will-o-the Wisp, 1762b.
 Willow, 3879b.
 Wilmington, Del., 3880a.
 Wilmington, N. C., 3880b.
 Wilmot, David, 3881a.
 Wilmot Proviso, 3880b.
 Wilson, Augusta Jane, 3881a.
 Wilson, Henry, 3881a.
 Wilson, James (America), 3881b.
 Wilson, James (England), 3881b.

Wilson, John, 3881b.
 Wilson, Margaret, 3888b.
 Wilson, William Lyne, 3890a.
 Wilson, Woodrow, 3762a, 3882a, 3927b.
 Wilton Rug, 3130b.
 Winchell, Alexander, 3890a.
 Wind, 1468b, 3890b.
 Wind, Trade, 3606a.
 Wind Cave National Park, 2743a.
 Windermere, 3891a.
 Windhover, 1942b.
 Windlass, 3891a.
 Windmill, 3891b.
 Window, 3892a.
 Windpipe, 3605a.
 Windsor, Ont., 3892a.
 Windsor Castle, 3892b.
 Windward Islands, 3892b.
 Windy Night, 2027a.
 Wine, 3892b.
 Winged Bull, 3893a.
 Winged Lion, 3893a.
 Winged Victory, 3233a, 3893a.
 Winkelried, Arnold, 3893b.
 Winnebago Indians, 3893b.
 Winnipeg, Lake, 3893b.
 Winnipeg, Man., 3893b.
 Winnipegosis, Lake, 3894b.
 Winona, Minn., 3894b.
 Winslow, John Ancrum, 3895a.
 Winston Salem, N. C., 3895a.
 Winter, 2034b, 3895a.
 Wintergreen, 3895a.
 Winter Solstice, 1166b.
 Winthrop, John, 3895b.
 Wire, 3895b.
 Wire Glass, 3896a.
 Wireless Telegraph, 3531a.
 Wireless Telephone, 3535a.
 Wire Nails, 2467a.
 Wire Rope, 3116b.
 Wireworms, 3896a.
 Wirz, Henry, 120b.
 Wisconsin, 3896a.
 Wisconsin, University of, 3900b.
 Wisconsin River, 3900b.
 Wisdom Teeth, 3527a.
 Wistaria, 3902a.
 Wister, Owen, 3902a.
 Witchcraft, 3172a, 3902a.
 Witch Hazel, 3902b.
 Witenagemot, 3902b.
 Witness, 3903a.
 Witte, Sergei Yulievitch, 3903a.
 Wittenberg, Germany, 3903a.
 Witwatersrand, The Transvaal, 3610a.
 Woad, 3903b.
 Woden, 2635b.
 Wolf, 3903b.
 Wolf and the Lamb, The, 2030b.
 Wolfe, James, 440b, 3904a.
 Wolf Fish, 3904a.
 Wolf's-bane, 14b.
 Wolseley, Garnet Joseph, 3904a.
 Wolsey, Thomas, 3904b.
 Wolverine, 1525b.
 Wolverine State, The, 2326a.
 Woman's Christian Temperance Union, 3905a.
 Woman's Relief Corps, 3905a.
 Woman Suffrage, 3905b.
 Wombat, 3906a.
 Women's Clubs, 3906a.
 Women Should Have the Vote (theme), 3560a.
 Wood, 3626b.
 Wood, A Cord of, 202a.
 Wood, Leonard, 3906b.
 Wood Alcohol, 3907a.
 Woodbine, 1714b.
 Wood Carving, 3907b.
 Woodcock, 3908a.
 Woodcock, 3908a.

Woodcraft Indians, 536b, 3261a.
 Wood Engraving, 1237b.
 Wooden Horse, 2460a.
 Wooden Pavement, 2759b.
 Woodmen of America, Modern, 3908a.
 Woodmen of the World, 3908b.
 Woodpecker, 3908b.
 Wood Pewee, 3909a.
 Wood Spirit, 2314a.
 Woodstock Ont., 3909b.
 Woodward, Calvin M., 2245a.
 Wool and Woolen Manufacture, 3909b.
 Woolflower, Chinese, 3910b.
 Woolworth Building, 2557a.
 Woonsocket, R. I., 3910b.
 Worcester, Mass., 3911a.
 Worden, John Lorimer, 3911b.
 Word Study, 2046b.
 Wordsworth, William, 3911b.
 Work, 3912b.
 Workhouse, 3912b.
 Workmen's Compensation Laws, 1222a.
 World, Rulers of the, 3131a.
 World's Columbian Exposition, 3912b.
 World War, 300a, 381a, 3913b.
 Worms, 3756b, 3861b, 3946b.
 Worms, Diet of, 2190b, 3040a.
 Worms, Germany, 3947b.
 Wormseed, 1537a.
 Wormwood, 3947a.
 Worsted, 3947a.
 Wort, 552b, 1082b, 3861b.
 Wounds, 3947a.
 Wreck of the Hesperus, 2043a.
 Wren, 3947b.
 Wren, Christopher, 3947b.
 Wrench, 3948a.
 Wrestling, 3948a.
 Wright, Carroll Davidson, 3949a.
 Wright, Harold Bell, 3949a.
 Wright, Orville and Wilbur, 1361b, 3949a.
 Wrinkles, 2843a.
 Writ, 3949b.
 Writing, 3949b.
 Writ of Assistance, 3950a.
 Wryneck, 3950b.
 Wurttemberg, Germany, 3950b.
 Wyandotte Cave, 3950b.
 Wyandotte Indians, 1740b.
 Wycliffe, John, 3951a.
 Wycliffe's Bible, 3951b.
 Wyoming, 3951b.
 Wyoming, University of, 3954b.
 Wyoming Valley Massacre, 3954b.

X

X, 3955a.
 Xanthippe, 3955a.
 Xavier, Francisco de, 2183a, 3955a.
 Xenia, Ohio, 3955a.
 Xenophon, 3955b.
 Xerxes, 2795a, 3955b.
 X-Ray, 3091a.
 Xylophone, 3956b.
 X Y Z Correspondence, 3956b.

Y

Y, 3957a.
 Yablonoi Mountains, 3957a.
 Yacht and Yachting, 3957a.
 Yak, 3957b.
 Yakima, Wash., 3958a.
 Yakima Indians, 3958a.
 Yale, Elihu, 3958b.
 Yale University, 3958a.
 Yalu River, 3958b.
 Yam, 3959a.

Yancey, William Lowndes, 3959b.
 Yang-tse-Kiang River, 3959b.
 Yankee, 3959b.
 Yankee Doodle, 3960a.
 Yankton, S. D., 3960a.
 Yapura River, 1878b.
 Yaqui Indians, 3960a.
 Yarkland, 3960a.
 Yarmouth, Nova Scotia, 3960b.
 Yarmouth, England, 3960b.
 Yarn, 3960b.
 Yates, Richari, 3961a.
 Yazoo Delta, 2362a.
 Yazoo River, 3961a.
 Year, 3961a.
 Yeast, 3961a.
 Yeats, William Butler, 3961b.
 Yellow, 3961b.
 Yellow Antimony, 140b.
 Yellowbird, 110b.
 Yellow Fever, 3961b.
 Yellow Fever Mosquito, 2422a.
 Yellow-hammer, 1346b, 3962a.
 Yellow Head Pass, 73a, 561a.
 Yellow Jacket, 3962a.
 Yellow Jasmine, 1457b.
 Yellowlegs, 3962a.
 Yellow Pine, 2855b.
 Yellow Sea, 3962a.
 Yellowstone National Park, 3962b.
 Yellowstone River, 3965b.
 Yellow-tail, 2298a.
 Yellow Tiber, 3577b.
 Yemen, Arabia, 3965b.
 Yen, 3966a.
 Yenisei River, 3966a.
 Yerba Mate, 2731b.
 Yerkes, Charles T., 3536a.
 Yerkes Observatory, 3966a.
 Yew, 3966a.
 Yggdrasil, 3966b.
 Yiddish, 3966b.
 Yoho Park, 2743b.
 Yokohama, Japan, 3966b.

Yonge, Charlotte Mary, 3966b.
 Yonkers, N. Y., 3967a.
 York, Eng., 3967a.
 York, House of, 3118b, 3967b.
 York, Pa., 3967a.
 Yorktown, Va., 3967b.
 Yosemite National Park and Valley, 3968a.
 Yoshi-hito, Harunomia, 3968b.
 Young, Brigham, 2413b, 3178a, 3968b.
 Young, Charles Augustus, 3969a.
 Young, Edward, 3969a.
 Young, Ella Flagg, 3969a.
 Young Italy, 3969b.
 Young Men's Christian Association, 3969b.
 Young Pretender, The, 3452a.
 Youngstown, Ohio, 3971a.
 Young Turks, 3653a, 3971a.
 Young Women's Christian Association, 3971a.
 Ypres, Battle of, 2881a.
 Ypres, Belgium, 3925a, 3971b.
 Ypsilanti, Mich., 3971b.
 Ysaye, Eugene, 3972a.
 Yuan Shi Kai, 804b, 3972a.
 Yucatan, 3972b.
 Yucca, 3972b.
 Yukon River, 3972b.
 Yukon Territory, 3973a.
 Yuma, 3973b.

Z

Z, 3974a.
 Zambezi River, 3974a.
 Zanesville, Ohio, 3974b.
 Zangwill, Israel, 3974b.
 Zanzibar, Island and Town, 3975a.
 Zealand, 3975a.
 Zebra, 3975a.
 Zeebrugge, Attack on, 3934b.

Zebu, 3975b.
 Zebulun, 3975b.
 Zechariah, 3975b.
 Zedekiah, 3975b.
 Zeisler, Fannie Bloomfield, 475b.
 Zemstvo, 3975b.
 Zemstvos Union, All-Russian, 3144b.
 Zenana, 3976a.
 Zend-Avesta, 3976a.
 Zenith, 3976a.
 Zeno, 3976a.
 Zenobia, 3976a.
 Zeoditu, Princess, 11a.
 Zephaniah, 3976b.
 Zephyrus, 31a.
 Zeppelin, Ferdinand, 3976b.
 Zeppelin Dirigible Balloon, 1365a.
 Zero, 3976b.
 Zeus (mythology), 1918b.
 Zeuxis, 2703a, 3976b.
 Zinc, 3977a.
 Zinc Etching, 3977a.
 Zinnia, 3977b.
 Zion, 1888b.
 Zion Church, 42b.
 Zionist Movement, 3977b.
 Zirconium, 3978b.
 Zither, 3978b.
 Zodiac, 1166b, 3978b.
 Zodiacal Light, 3978b.
 Zola, Emile, 3979a.
 Zollverein, 3979a.
 Zone, 3979b.
 Zoological Garden, 3979b.
 Zoology, 3980a.
 Zorn, Anders Leonhard, 3987a.
 Zoroaster, 3987b.
 Zouaves, 3987b.
 Zuider Zee, 2512b, 3987b.
 Zulus, 3988a.
 Zuni, 3988a.
 Zurich, Lake, 3988b.
 Zurich, Switzerland, 3988b.
 Zwingli, Ulric, 3041a, 3988b.

Deacidified using the Bookkeeper process.
Neutralizing agent: Magnesium Oxide
Treatment Date: February 2019

PreservationTechnologies

A WORLD LEADER IN COLLECTIONS PRESERVATION

111 Thomson Park Drive
Cranberry Township, PA 16066
(724) 779-2111

LIBRARY OF CONGRESS



0 033 997 270 9